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Development of an Air Quality Monitoring Network for Kosovo

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List of acronyms:

NO_x	**Nitrogen Dioxide**
SO_2	**Sulphur Dioxide**
CO	**Carbon Monoxide**
Pb	**Lead**
PM_{10}	**Particulate matter**
$PM_{2.5}$	**Particulate matter**
O_3	**Ozone**
As	**Arsenic**
Cd	**Cadmium**
Ni	**Nickel**
BaP	**BenzoApyrene**
PAH	**Polycyclic aromatic hydrocarbons**
VOC	**Volatile organic compounds**
MESP	**Ministry of Environment and Spatial Planning**
IHMK	**Institute of Hydrometeorology of Kosovo**
NIPH	**National Institute of Public Health**
CAFE	**Clean Air for Europe**
KEPA	**Kosovo Environment Protection Agency**
KEK	**Energetic Corporation of Kosovo**
EEA	**European Environment Agency**
EIA	**Environmental Impact Assessment**

Executive Summary

This Capstone Project addresses the important problem of air pollution in Kosovo and the need for improvement of the air quality monitoring system, in compliance with Directive 2008/50/ EC on Ambient Air Quality and Cleaner Air for Europe.

The development of a proper air quality monitoring system will help in assessing the current state of air quality, identifying the major air pollutants and acting promptly by reducing emissions if limit values are exceeded.

Activities involved in the completion of the project include the following:

- Selection of the possible monitoring areas, based on determined criteria.
- Classification of monitoring sites (locations)
- Designating the necessary number of air quality monitoring stations.

Currently, data is available from the measurements in one suburban area in Institute of Hydrometeorology of Kosovo (IHMK) Prishtina municipality where PM_{10}, SO_2, NO_2, CO, O_3 are measured. Based on the assessment that is done using this data, it can be concluded that in this site the limit values for SO_2, NO_2, CO, O_3, are in compliance with EU standards. However there is a concern for the exceeded limit values of PM_{10} at this site, which are above limit values of 50µg/m^3 (EU standard). By developing the Air Quality Monitoring System we will get more reliable data that will assess the air quality for all of Kosovo. These assessments of air quality can be used to propose plans and programs for reducing air pollution and improve the air quality, in particular in urban areas and around large industrial installations.

This project has identified eight new possible locations taking in consideration all relevant information about the source of pollution, types of areas, number of inhabitants and other relevant factor. Besides the existing stations in Prishtina, new identified locations are Mitrovica, Drenas, Prizren, Peja, Gjakova, Kaçanik, Gjilan and Brezovica. The outcome of this project is a functional and reliable Air Quality Network Monitoring System for Kosovo in order to facilitate the air quality assessment and improve air quality in Kosovo

The estimated cost for the initial installation of one air monitoring station is € 198,000.00. For maintenance and operation it is calculated 10% per year of the original cost of the system. The total budget for the five year midterm plan, including the expenses for staff recourses, will be €2,562,000.00. This investment is expected to be jointly supplied by the European Commission and Government of Kosovo in the 2011/12 period.

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Chapter One

Air Monitoring Situation in Kosovo

1.1. Air Pollution in Kosovo and EU accession

Air quality is a major issue for all big cities in the world and Kosovo is no exception.

The air pollution in Kosovo due to traffic and industry is abundant especially in areas were human population is concentrated.

The fast rate in economic growth is bringing more sources of air pollution, in this context the air quality monitoring system will ensure a sustainable development of the urban and industrial area, minimizing and preventing the air pollution impact on human health.

Monitoring of all pollutants defined by the Air Law does not exist at the moment and therefore the air quality data are very limited. Therefore it is very problematic to evaluate actual level of air pollution and assess possible negative impacts on human health and environment. In addition no emission inventories have developed as well as the Cadastre of air pollutants is missing.

Currently the major contributors to air pollution in Kosovo are both mobile and stationary sources. In the urban areas the air pollution is dominated by traffic and residential heating and in the industrial areas it is accompanied by big stationary sources. Industrial areas include energy production facilities such as thermal power plants, industrial activities such as metallurgy, mining and cement production. In addition biomass burning in agricultural areas and fires at illegal waste disposal sites are possible sources.

Energy production facilities use fossil fuels such as local lignite and oil derivates with relatively high sulphur content. The transport sector is characterized by a large number of old vehicles using liquid fuel with inadequate quality. In addition, the industrial sector has mainly outdated equipment. In bigger cities, central heating systems are not frequent. Therefore, air pollution in residential areas is caused by the individual heating facilities using lignite, wood or oil as primary energy source.

The agricultural sector contributes mainly to air pollution through burning the biomass. Illegal waste disposal sites with frequent uncontrolled burning of waste represent serious source of air pollution too.

Generally low levels of awareness among enterprises, consumers and the general public regarding the air pollution and air quality also contribute to the current situation.

In Kosovo ambient air quality is very poor in developed urban areas, especially in the vicinity of industrial sites. The biggest impact to air quality at Prishtina area is caused by the thermal power plants KEK (TCA and TCB) with an installed capacity of 1513 MW.

The Mitrovica area with industrial waste left over from the Trepca complex is counted as one of the major sources of pollution in that area.

The Ferro-nickel metallurgical complex in Drenas is the biggest industrial site in operation which has strong impact to air quality in the area.

Air quality problems are related mainly to pollutants as oxides of nitrogen (NOx), ozone (O3), heavy metals (Pb, Ni), particulate matter (including PM10, PM2.5), volatile organic compounds (VOCs). In addition polyaromatic hydrocarbons and dioxines might be problems.

Potential sources of air pollution are following:

- Power Plants (Kosovo A and Kosovo B);
- Traffic;
- Lignite surface mining in Obilic;
- Industrial complex and dumpsites in Mitrovica;
- Ferro-nickel metallurgy in Glogovac;
- Cement Factory Sharcem in Han- Elezit;
- Central heating systems in big cities (Prishtina, Gjakova and Mitrovica);
- Residential heating;
- Biomass burning in agricultural areas;
- Production of base asphalt etc.

The Air quality Sector within the Ministry of Environment and Spatial Planning (MESP) is in the process of drafting the legislation infrastructure for air quality which is in compliance with EU policies and legislation on air quality. This was the major challenge for Kosovo with the long-term perspective of approximating the EU Acquis in order to be fulfilled the criteria for EU accession.

With this in mind, the governments of Kosovo, as a potential EU country should endeavour to focus its efforts and actions on addressing those issues and requirements that are fundamental to the implementation of the legislation in this sector, in particular by ensuring that:

- air quality management and regulation is effectively integrated with that for other environmental sectors

- quality-assured assessment of ambient air quality is undertaken as a prelude to formulating a strategy for air quality improvements, and mapping/inventory of sources

- a comprehensive plan (air quality management strategy) is drawn up for improving and maintaining air quality, addressing all pollutants of concern and focusing on issues of immediate concern in terms of complying with air quality criteria;

- arrangements are put in place for the effective involvement and participation of all other bodies or interest groups that have a significant role or function to perform in relation to air quality management

- adequate provision is made for the monitoring, regulation and enforcement of the legislation, regulations, permits and licenses. In particular, sufficient human and technical resources need to be allocated to enable all functions to be properly performed;

- record keeping and reporting is performed to meet the requirements of the directives and to inform the public; and the air quality management plan is regularly reviewed and updated to ensure that it remains relevant to the key issues of concern.

1.2. Current network monitoring situation in Kosova

The First fully automatic air quality monitoring stations were installed in Prishtina on January 2009. The stations NIPH 1 and 2 belong to the National Institute of Public Health (NIPH) and they measure sulphur dioxide (SO_2), nitrogen oxides (NOx) and total suspended particulates (TSP).

The station NIPH 1 – is located near crossroad of main street of Prishtina. The sample inlet is 3-4 meters above ground level. The site meets the requirement to be classified as traffic urban site, Figure 1.1.

Sulphur dioxide is measured by Ultraviolet Fluorescence (EN 14212), nitrogen oxides are measured by Chemiluminescence (EN 14211) and total suspended particulates are measured by nephelometry using sample heating.

Figure 1.1. Station NIPH 1, Pristhina

The second NIPH station (NIPH 2) is located on the premises of the NIPH in southern part of Prishtina.Figure. 1.2. The station is located in an urban background environment. The location is only 1.8 km from the urban background station of the Institute of Hydrometeorology of Kosovo (IHMK).

Figure 1.2. Station NIPH 2, Prishtina

The NIPH stations have encountered several technical problems and the data from those monitoring sites is very limited. NIPH has measured SO_2, NOx and TSP since January 2009 in two locations in Prishtina. The data is available only until March 2009 as afterwards the data connection and collection of the monitoring data was stopped.

The Institute of Hydrometeorology of Kosovo (IHMK) received a new monitoring station in September 2009, Figure.1.3. The station is equipped with automatic analyzers for sulphur dioxide (SO_2), nitrogen oxides (NOx) carbon monoxide (CO), ozone (O_3), fine particulate matter PM_{10} or $PM_{2.5}$, depending on the size selective inlet used on that analyzer. The station is located in the premises of IHMK.

Figure 1.3. IHMK, Prishtina

In addition IHMK received one small container for PM measurements as a donation from Slovenia which is located in the vicinity of ex-Rilindja building. The container is equipped with the three-channel optical analyzer (Grimm Model 180), which is currently configured to measure PM_{10}, $PM_{2.5}$ and PM_1 fractions.

Location of the IHMK station no 2 in Prishtina - is presented in Figure 1.4.

Figure 1.4. IHMK- MESP, Prishtina

This site is located in within the yard of MMPH, near by traffic road. The sample inlet is 4 meters above ground level. The site meets the requirement to be classified as traffic urban site. The monitoring objectives are to determine compliance with air quality limit value to detect pollutant levels of PM_{10}, $PM_{2.5}$ and to provide pollutant levels for daily air quality index reporting.

Table.1.1. Shows the type of substances which are monitored in the existing monitoring site within the Institute of Hydrometeorology of Kosovo (IHMK) in a one month period. Based on these measurements and the average value for one month it is observed that the dominant polluter is PM_{10}.

This preliminary assessment of air quality in Kosovo is based on currently available air quality data from these limited monitoring activities. The monitoring data is evaluated according to the European air quality standards laid out in Directives 2008/50/EC and 2004/107/EC.

Table 1.1. Current data from Institute of Hydrometeorology of Kosovo (IHMK)

Monthly report - assessment level of substances in air compared with European Union limits							**Reported period: January 2010**			
							Station: 1 Prishtina			
	SO2 [µg/m3]		PM10cont [µg/m3]		NO2 [µg/m3]		CO [µg/m3]		O3 [µg/m3]	
	D1	D24	D1	D24	D1	D24	D1	m D8	D1	m D8
EU-LV	350	125		50	200			10000		120
EU-NLV	24	3		35	18			0		25
EU- LV+MT	350	125		50	200			10000		120
Average monthly values in IHM of Kosovo	**9.4**	**9.5**	**84.8**	**72.3**	**26.2**	**26.3**	**4899**	**5382**	**25.4**	**36.9**
No. limit exc.	0	0		**6.0**	0			0		0

Legend:
LV - limit value
NLV - acceptable number of exceeds limit value in year
LV + MT - limit value + margin of tolerance
Average - arithmetic average from good data in series
No of exceed. limit val. - number of exceedency limit
D1 - 1-hour average
mD8 - maximum 8-hour average per day
D24 - 24-hour average

Taking in consideration that the actual existing air quality network monitoring system is not completely developed either in Prishtina as well as in other parts of Kosova, we can not have real picture about air quality for Kosovo in general. That's why is necessary to develop the existing monitoring network that will include the other sites in Prishtina and other municipalities of Kosovo, which is needed for full assessment of air pollution and its effects, to abate the pollution effectively and improve the air quality in Kosovo.

The air quality monitoring network development for all of Kosovo will depend upon the monitoring objectives in the selected areas of interest stated below:

- To determine compliance with national air quality standards or, where necessary, other air quality limits or guideline values
- To provide a basis for the implementation of EU Directives on air quality
- To assess human population and ecosystem exposure to air pollutants
- To provide air quality information to the public
- To identify pollution sources and areas at risk from air pollution
- To establish scientific support for policy making on pollutant emission control, traffic management and industrial development
- to evaluate long-term trends in air quality
- to participate in EU exchange of information activities and contribute to the EU air quality monitoring network.

Chapter Two

Air Quality Legislation

2.1. EU Air Quality Legislation and the Existing Situation in Kosovo

European Union environmental legislation has developed over the last 30 years and comprises today some 300 legal acts, including directives, regulations, decisions and recommendations.

EU environmental legislation covers:

Directives

Most EU environmental laws are directives. This is a form of law peculiar to the European Union. They are designed to impose obligations on Member States and to be sufficiently flexible to take into account differing legal and administrative traditions. The choice and method of aligning the national legal and administrative system is left to the discretion of the Member State.

Framework directives

The Framework directives set out general principles, procedures, and requirements for legislation in different sectors. So far they have been adopted for the air and waste sectors, and a proposal has been made for the water sector.

Regulations

About 10% of EU environmental laws take the form of regulations. Regulations are directly binding in Member States and supersede any conflicting national laws. Regulations usually have a precise purpose, and are used where it is important that in the Member States precisely the same requirements are applied. It is important to analyze the impact of the regulations in order to know what actions will be necessary to approximate the linked directives.

Decisions

Decisions are individual legislative acts which are binding in their entirety upon the parties to whom they are addressed. They differ from regulations or directives in that they are usually very specific in nature. They are less common in the environmental field. Environmental regulations or directives often give the Commission the power to take decisions to implement them.

In the fifth environmental action program which was presented in 1992, could be seen some first steps towards a more clearly aimed and strategic policy and proposals for long-term environmental objectives for air quality.

As regards it is stated that “all people should be effectively protected against recognized health risks from air pollution,” and that “permitted concentration levels of air pollutants should take into account the protection of the environment.”

Ten years later, the European Community’s Sixth Environmental Action Programme (6th EAP) focused on air pollution concerns under the environment and health target area. The aim was to reach acceptable air quality levels that do not have negative impacts on or lead to risks to the environment or health.

The more strategically oriented work on air quality that was set in the 1990s followed up by a new program under the name of CAFE, Clean Air for Europe, which was presented by the Commission in 2001. The need for this new program derived from the fact that several directives of importance for emission levels and air quality werw due for revision around 2004, and for proper results it would, in the view of the Commission, be necessary to gather them into a single program.

Implementation and review of the effectiveness of existing air quality legislation takes place under the CAFE Programme, including a review of the first three air quality daughter directives (1999/30/EC, 2000/69/EC and 2002/3/EC).

Since 2002, a fourth daughter directive (2004/107/EC) on heavy metals in ambient air was adopted and, even more importantly, the new consolidated framework directive (2008/50/EC) on ambient air quality and cleaner air for Europe.In line with the EU’s ongoing modernization and streamlining of EC legislation, the EU adopted Directive 2008/50/EC in 2008, which will recast and consolidate the current directives on ambient air quality into one piece of legislation.

Legislation considered in the field of air quality assessment and management: In 1996, the Environment Council adopted the Framework directive on ambient air quality assessment and management (96/62/EC). The Directive sets a general policy framework for dealing with air ambient quality. Provides the means for setting limit values to the concentrations of pollutants in the air.

The first daughter directive - under the Air Quality Framework Directive (96/62/EC), the Sulphur Dioxide, Nitrogen Dioxide and Oxides of Nitrogen, Particulate Matter and Lead in Ambient Air Directive (99/30/EC).

It repealed most of the provisions of the three directives regulating the levels of sulphur dioxide, lead and nitrogen dioxide in air by July 2001 and will repeal the remaining provisions on January 2010 (for the directive on nitrogen dioxide).

The second daughter directive - on benzene & carbon monoxide in ambient air (2000/69/EC)-

Establishes limit values for the said pollutants. It requires Member States to assess the concentrations of those emissions based on common methods and criteria, and contains public access to information provisions.

The third daughter directive - on ambient ozone (2002/3/EC) has repealed, with effect from 1 September 2003, the Tropospheric Ozone Directive (92/72/EC).

It aims to ensure common levels of ozone in order to protect human health and the environment as a whole through defined threshold levels for limit- and target-based values for zones and agglomerations. Member States are required to set alert thresholds and inform the public of ambient ozone levels and undertake monitoring.

A fourth daughter directive - on heavy metals in ambient air -regulates the remaining pollutants heavy metals - these include mercury (Hg), cadmium (Cd), arsenic (As), nickel (Ni) and polycyclic aromatic hydrocarbons (PAH).

Directive 2008/50/EC on ambient air quality and cleaner air for Europe -was adopted in late 2008, this version contains both the current legislative framework (Directive 96/62 and its daughter directives) and the recently consolidated framework (Directive 2008//50/EC).

Directive 2008/50/EC includes the following key elements:

- The merging of most existing legislation into a single directive (except for the fourth daughter directive) with no change to existing air quality objectives.
- New air quality objectives for $PM_{2.5}$ (fine particles), including the limit value and exposure-related objectives — exposure concentration obligation and exposure reduction target.
- The possibility to discount natural sources of pollution when assessing compliance against limit values.
- The possibility for time extensions of three years (PM_{10}) or up to five years (NO_2, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Candidate countries, are strongly advised to integrate the framework directive and its four daughter directives in one legislative framework as the logic is the same and the provisions are very similar. Furthermore, unless transposition of the framework directive and its four daughter directives is in an advanced stage, it would be more cost effective and logical to focus on transposing and implementing Directive 2008/50/EC, which covers all the relevant provisions.

These particular directives focus on the maintenance and improvement of air quality with respect to the following thirteen pollutants:

1) sulphur dioxide;

2) nitrogen dioxide;

3) fine particulate matter such as soot;

4) suspended particulate matter;

5) lead;

6) ozone;

7) benzene;

8) carbon monoxide;

9) polycyclic aromatic hydrocarbons;

10) cadmium;

11) arsenic;

12) nickel; and

13) mercury

Achieving and maintaining compliance with EC policies and legislation on air quality management presents a major challenge for Kosovo.

2.2. Existing Legislation on Air Quality in Kosovo

With the long-term perspective of approximating the EU Acquis, the Kosovo government has set itself the policy objective to mitigate the pressures on the environment so that European Environmental Standards will eventually be achieved.The roots of the Air Quality Legislative framework of Kosovo go back to the Environment Protection Law of 2003 and Law on Air Protection of 2004.

The Law on Air Protection sets the ground for several sub-legal acts, called "Administrative Instructions" (AI), which covers air emissions from various sectors, setting emission limit values and/or standards. A number of emission related AI already exist, such as those:

AI on Environmental Permits,
AI on Environmental Inspection,
AI on rules and standards of the discharges on air by the stationary sources of pollution

Not all relevant sectors are already covered. As it seems, an AI with ELVs is still lacking for domestic heating and small combustion, which is an important source for air pollution in Kosovo.

Concerning the legislation relevant to air quality management it should be noted that the current Law on Air Protection does still not define any air quality standards.

Also is supposed to set out in an EU-compatible way all sorts of criteria and specifications around air quality assessment, including monitoring, modeling and information of the public on air quality.

The Law on Air Protection was amended in 2009 in order to better reflect the Community Acquis.

There are two institutions subordinated to the MESP, which play the predominant role in relation to Air Quality: the Kosovo Environment Protection Agency (KEPA) and the Kosovo Hydro-meteorological Institute (HMIK).

The HMIK is currently the main institution that conducts Air Quality measurements in Kosovo on a regular basis.

Chapter Three

Development of an Air Monitoring Network for Kosovo

3.1. Development of an Air Quality Monitoring Network for Kosovo

In order to develop the Air quality network monitoring system the working group of professional staff from Air Quality Sector from the MESP, in presence of assistance of expert from TAIEX mechanism within the European Commission, visited other locations in Prishtina as well in the rest of Kosovo in order to determine the appropriate sites.

Basically, the development of this air quality monitoring network included besides the existing stations within Prishtina municipality, the determining of the number of other stations and their locations in Prishtina and the rest of the Kosovo, monitoring methods, with a view to the objectives of air quality monitoring.

The scientific approach, which was used by the working group for the network design, appropriate over the national-state scale, involves placing monitoring stations or sampling points at carefully selected representative locations, chosen on the basis of criteria for design and establishment of air quality monitoring.

Criteria used for development of air quality monitoring are described below:

- Selection of pollutants
- Area of representativeness of monitoring stations
- Selection of areas to be monitored;
- Classification of monitoring sites (location);

3.2. Selection of pollutants

The indicators according to the "Law on Air Protection"- are listed:

- SO_2 - Sulphure dioxide
- CO - Carbon monoxide
- O_3 - Ozone
- NO - Nitrogen Oxide
- Heavy metals (lead, arsenic, mercury, cadmium, nickel and their compounds)
- Halogens
- Hydrocarbons (benzene)
- PM_{10}, $PM_{2.5}$, PM_{1-}

When selecting compounds to be included in air quality monitoring, the following criteria should be considered:

- The compounds should be related to actual air pollution problems in Kosovo, at present and foreseen in the future.
- The compounds should be measured fairly extensively in Kosovo, or the extent of monitoring should be increasing due to emerging concerns (for example: PM_{10} and $PM_{2.5}$).

The compounds listed in Table 3.1.are proposed for inclusion in the Air quality monitoring network, for the 3 types of receptors: population, materials, ecosystems. The compounds and indicators are listed in 3 groups of priority. The networks and stations selected should first cover at least most of the Priority 1 compounds.

Table 3.1. Selected pollutants and indicators

	Population exposure		**Materials exposure**		**Ecosystems exposure**	
	Aver. time	Medium/ compound	Aver. time	Medium/ compound	Aver. time	Medium/ compound
Priority 1	1h (24h) 1h or 24h 24h or longer	Air. SO_2, NO_2, NOx,O3 PM10, PM2.5 Pb	24h or Longer “ aa	Air: SO_2, O_3, NO2, temp., relative humidity Precipitation: mm, pH Materials[3):] Weight loss, steel panels	1h 24h aa 24h	Air: O3 SO2, SO42-, NO2. Nox Precipitation: SO42-, NO3-, NH4+, Ca2+, pH, (H+)
Priority 2	1h 1h or 24h 24h or longer	CO SPM (or TSP), BS Benzene, PAH, Cd, As, Ni, Hg	24h or Longer “ “ aa	Air: HNO3 (gas) Precipitation: Cl, SO42-, NO3- Soiling: PM10, SO42- Materials Weight loss, zinc panels	1h	Air: VOC, NOx
Priority 3	Other compounds		aa	Materials Weight loss, copper panels. Damage to calcareous stone		

aa: Annual average/exposure.

The measuring methods used for the measuring the pollutant concentrations are:

- for SO_2 UV fluorescence
- for NO_2 chemiluminescence
- for lead atomic absorption spectroscopy
- for CO non-dispersive infra-red spectrometry
- for benzene gas chromatograph
- for ozone UV photometry

3.3. Area of representativeness of a monitoring station

In general a monitoring station when it is determined gives air quality data that are representative for a certain area around the station. The area in which the concentration does not differ from the concentration measured at the station by more than a specified amount can be called the *area of representativeness* of the station. The specified amount could be the total measuring uncertainty, or the data quality objective (quantitative value) for the pollutant under consideration.

A determination of the area of representativeness (quantitatively, or qualitative evaluation) is of value when monitoring data are to be used to calculate exposure (of the population, or materials, or ecosystems), and also when used to validate dispersion models.The area of representativeness is not easily determined. It requires either extensive monitoring at several adjacent sites covering an area around the station, or rather detailed dispersion model calculations based upon detailed emission inventories, both for the area in question and the larger surrounding area. In practice, such determinations are rarely performed.

Chapter four

Selection Criteria

4.1. Selection of areas to be monitored

This Air quality monitoring network should give a “representative” picture of air quality in Kosovo. The term “representative” is defined in terms of pollution effects, which again are a function of the exposure of people, objects and ecosystems to the air pollution.

Criteria for selection are related to:

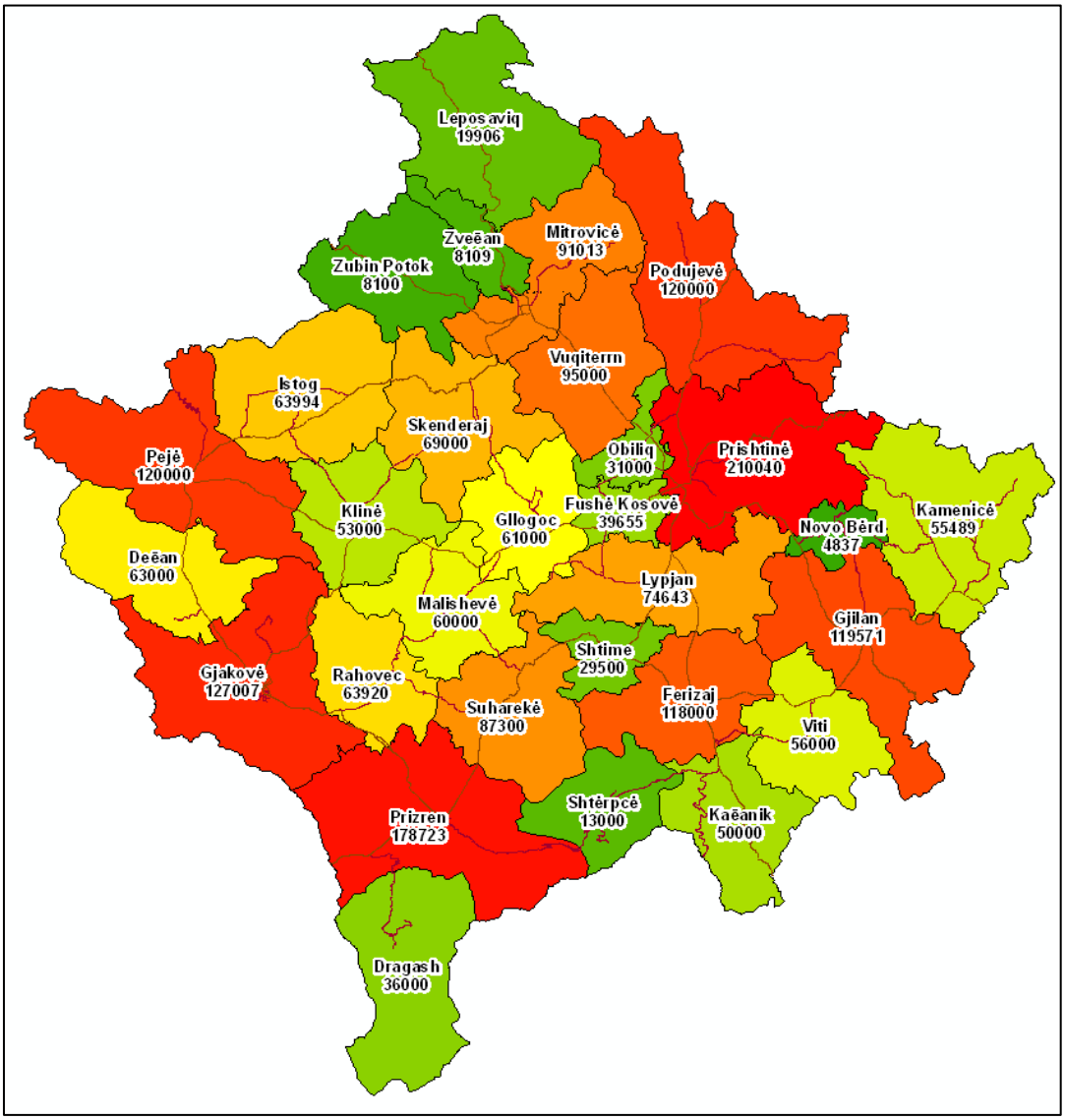
- the spatial distribution of populations, objects and ecosystem;
- the range of exposure situations in space and time, from low to the highest exposure.

This spatial exposure distribution is different for each compound and for each type of exposed “stock at risk” (people, objects, ecosystems).

4.2. Representative monitoring of population exposure

The total population of Kosovo is up to 2.600.000. The Capital of Kosovo, Prishtina with 600.000, other cities like Prizren - 220.000, Peja-180.000, Gjakova-150.000, Gjilan-133.724, Mitrovica-120.000, Kacanik-59.000, Drenas-73.300, respectively as shown in the figure 4.

Figure 4.1. Kosovo Population Exposure



- Area 10 800 km^2
- Population up to 2 600 000
- Prishtina city > 600 000

There are differences in the types of industries, sources of air pollution, and thus the air quality differ between the regions of Kosovo. Within each of these regions, cities experience different air pollution levels due to differences in (in approximate decreasing order of importance): dispersion conditions, source composition, and size.

In rural areas, the pollution level also varies spatially, dependent upon the city emission sources, larger power plants and industrial complexes, and regional traffic activity.

4.3. Cities

With other parameters equal, city centre pollution levels increase with the city size (i.e. population), although considerably less than proportionally. The capital city Prishtina defined as >0.5 mill. inhabitants, should be selected as an area for air quality monitoring, for all the smaller cities in Kosovo, a subset must be chosen.

Medium cities 0.25-0.5 mil inhabitants should be included as the area for air quality monitoring, and cities of 0.05- 0.25 mill. inhabitants (small cities), should be included as well, see Table 4.1.

Table 4.1. Criteria for selecting areas for representative of population exposure

Cities	Total population (millions)	Selection criteria	Total number of areas to be monitored	Total population covered
> 0.5 mill.	Prishtina- 600.000	One-the selection must contain all station categories represented in the city	1	600.000
0.25-0.5 mill.	None	None	None	None
0.05-0.25 mill.	17 Cities	At least 10% of the cities	2	183.000
Rural	1			
Industrial	4			

When selecting the cities, the extent of industrial sources with significant air pollution impact within the cities should be considered. Within each size range, cities with low, medium and high level of industrialization should be represented.

In the selected cities, all monitoring stations should be part of Air quality network monitoring system, to get as good basis as possible for estimating the population exposure. A good spatial distribution of urban background stations is particularly important.

4.4. Rural areas

In rural areas (which here means areas outside cities larger than 50,000 inhabitants), emphasis on air monitoring for health effects should be on secondary pollutants such as ozone, and PM_{10} (and finer particles, $PM_{2.5}$).

Areas with population density over a certain level should be identified in each country. Many of those areas should be monitored, such that a substantial part of the rural population is covered by the monitoring network. The Air Quality monitoring network should evaluate the necessary extent of monitoring in populated rural areas, based upon:

- a listing of the areas with population above a certain density limit ;
- the area of representativeness of monitoring stations located in the areas, based upon knowledge of the spatial variation of the air pollutant in question.

4.5. Industrial areas outside cities

Such areas exist in Kosovo. Industrial areas should be selected where such industries cause air pollution levels approaching those of medium size cities, or approach WHO Air Quality Guidelines or the proposed new EU Limit Values (CEC, 1997).

According to the criteria presented in Table 4.1 we can propose four additional cities, Prizreni, Peja, Gjakova, Gjilan, which should be taken into consideration to be monitored. Also one rural area, in addition to four industrial areas outside cities that have influence in these cities (Prishtina, Mitrovica, Drenas, Kaqanik)

4.6. Representative monitoring of exposure of materials

Most material exposure is related to human activities and is well correlated to the population in the areas. Urban and industrial areas will therefore represent the major part of and the highest cost of material damage. In rural areas the total amount is much smaller. Even so, valuable and prestige buildings and monuments are also found in rural areas.

The building techniques and materials used may differ between cities and for bigger cities even inside the country. The selection of sites must take this variation in customs and techniques into account, to have representative sites for the different areas.

Inside a city the deterioration is affected by the pollution levels observed. Three sites might be chosen, representing the highest city background level (often near the city centre), a more average background level in the city, and a traffic hot-spot station.

In industrial areas, two sites representing the high and medium pollutant levels of the area could be selected.
The material deterioration is also affected by the climatic conditions. The sites should therefore be selected so the different climatic conditions inside Kosovo are represented by the site selection.

4.7. Representative monitoring of exposure of ecosystems

The ecosystems and the natural factors influencing them (e.g. the atmosphere, soil and water conditions) vary of course strongly from region to the region in Kosovo. Also, since the air pollution concentrations and deposition varies strongly, representative monitoring of eco systems means that a monitoring needs to cover a large selection of ecosystems, i.e. the regions and areas within regions.

The ecosystems dealt with are:

- fresh waters,
- forests,
- agricultural crops,
- whole ecosystems by integrated studies of waters, soil, forests.

Chapter five

Classification Criteria

5.1. Classification criteria for monitoring stations

Stations are classified according to the following criteria:

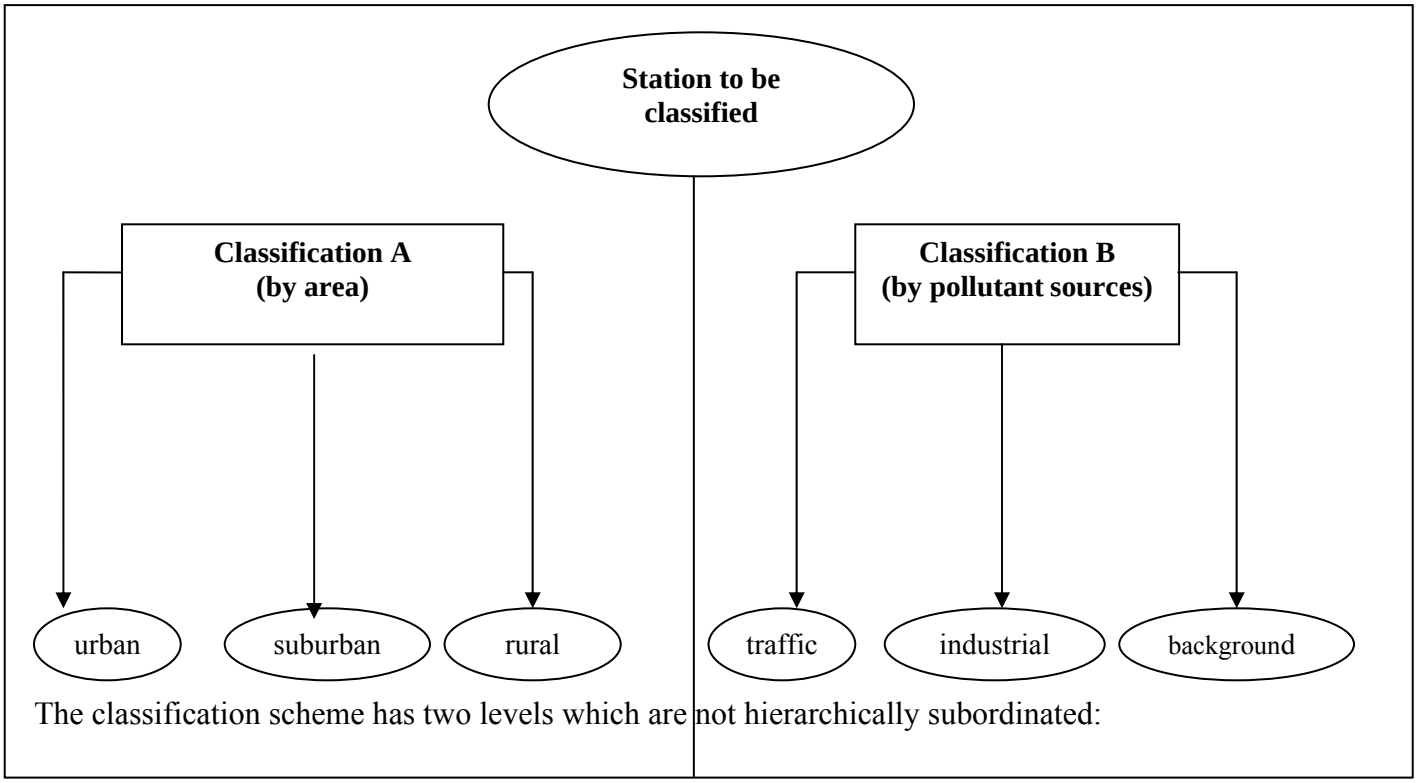
- Type of area (urban, suburban, rural)
- Type of station (traffic, industrial, background)
- Characterization of zone (residential, commercial, industrial, agricultural, natural and combinations of these, e.g. RES/COM, COM/IND, IND/RES, RES/COM/IND, AGR/NAT).

Table 5.1. The station classification criteria

Type of station	Type of area	Characterization of area
Traffic (T)	Urban (U)	Residential (R)
Industrial (I)	Suburban (S)	Commercial (C)
Background (B)	Rural (R)	Industrial (I)
		Agricultural (A)
		Natural (N)
		Res/Com (RC)
		Com/Ind (CI)
		Ind/Res (IR)
		Res/Com/Ind (RCI)
		Agri/Natural (AN)

It means that stations should be classified according to the area type where they are located, and according to what type of sources dominates the air pollution levels at the station, presented in Figure .5.1.).

Figure 5.1. Classification of stations



The classification scheme has two levels which are not hierarchically subordinated:

Level 1 -Types of area where they are located

Level 2 - Types of stations (based on pollutant sources)

Type of area

Level 1 -The following types of area have been defined in the Table 5.2. and 'rural' area type being further sub-classified.

Table 2.2. Type of area

Associated code	Definition text	Definition code
1	urban	U
2	suburban	S
3	rural	R
31	Near-city area	R NCA
32	Regional area	R REG
33	Remote area	R REM

In order to define the area types the detailed definitional are prescribed based on the distribution density of the building:

5.2. Urban area (U)

Continuously built-up urban area meaning complete (or at least highly predominant) building-up of the street front side by buildings with at least two floors or large detached buildings with at least two floors. With the exception of city parks, the built-up area is not mixed with non-urbanized areas.

5.3. Suburban area (S)

Largely built-up urban area 'Largely built-up' means contiguous settlement of detached buildings of any size with a building density less than for 'continuously built-up' area. The built-up area is mixed with non-urbanized areas (e.g. agricultural, lakes, woods). It must also be noted that 'suburban' as defined here has a different meaning than in every day English i.e. 'an outlying part of a city or town' suggesting that a suburban area is always associated to an urban area. In our context, a suburban area can be suburban on its own without any urban part.

5.4. Rural area (R)

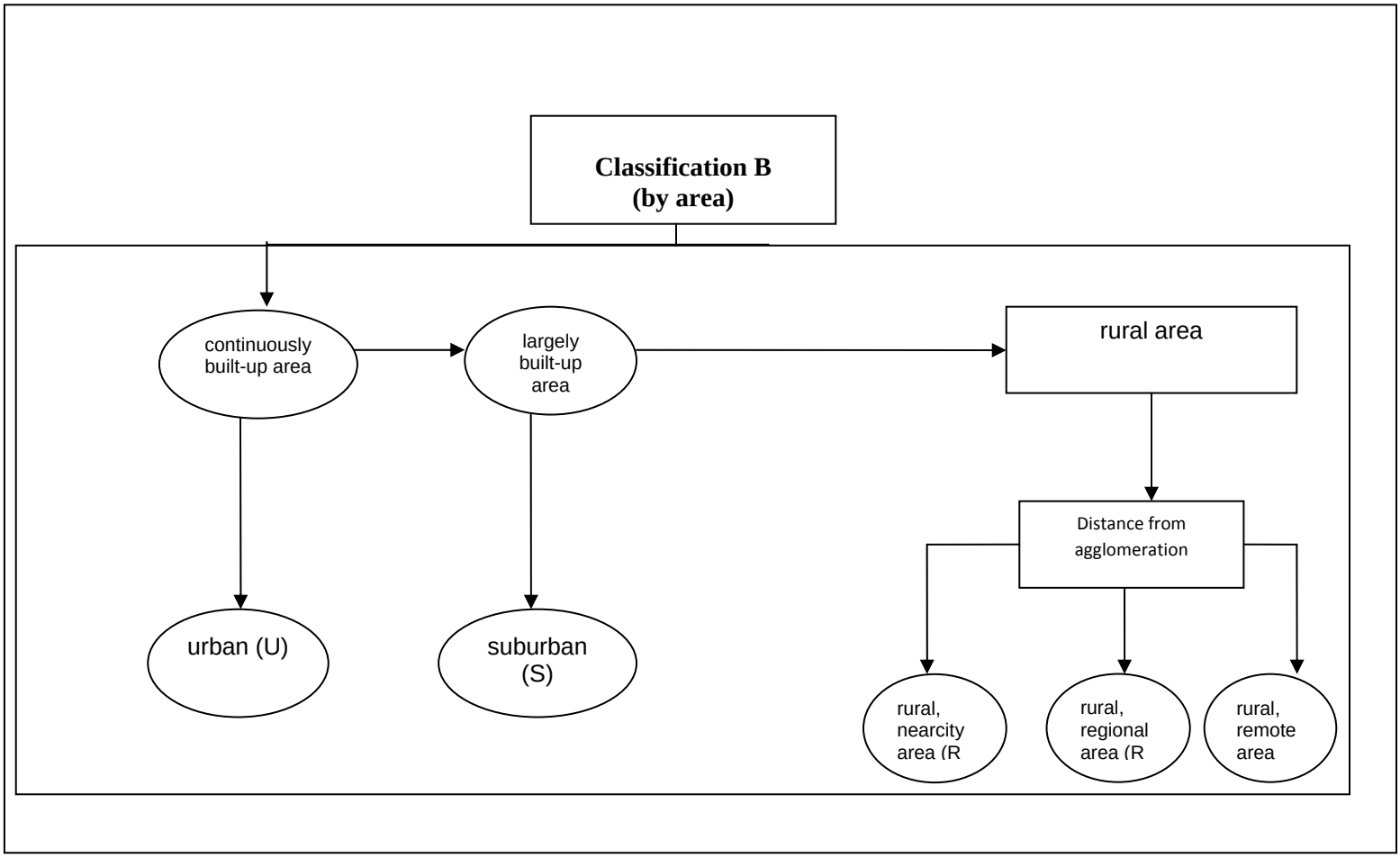
All areas that do not fulfill the criteria for urban or suburban areas, are defined as rural areas.
Rural areas can be subdivided further, based upon the distance to major sources or source areas:

- Near-city area (R NCA): area within 10 km from the border of an urban or suburban area.
- Regional area (R REG): 10-50 km from major sources/source areas
- Remote area (R REM): > 50 km from major sources/source areas.

The distances given here are only indicative. Border in this case should be understood as the factual delimitation of the built-up area, not the administrative border.

In Figure.5.2. Is presented scheme of classification by area:

Figure 5.2. Classification by area



Level 2- Type of station in relation to dominant emission sources

The station type is defined in relation to the dominant emission sources influencing the air pollutant concentrations at the station, presented in Table 5.3.

Table 5.3. Type of station

Associated code	Definition text	Definition code
1	traffic	T
2	industrial	I
3	background	B

In order to define the station types the detailed definitions are prescribed;

5.5. Traffic station (T)

Located such that its pollution level is determined predominantly by the emissions from nearby traffic (roads, motorways, highways).

5.6. Industrial station (I)

Located such that its pollution level is influenced predominantly by emissions from nearby single industrial sources or industrial areas with many sources. Industry source is here taken in its wide meaning including sources like power generation, incinerators and waste treatment plants.

5.7. Background station (B)

Located such that its pollution level is not influenced significantly by any single source or street, but rather by the integrated contribution from all sources upwind of the station (e.g. by all traffic, combustion sources etc. upwind of the station in a city, or by all upwind source areas (cities, industrial areas) in a rural area).

Additional information about the all stations

In Table 5.4. is expressed representativeness expressed by the length (in km) of the street/road that the station represents (in case of traffic station).

Table 5.4. Representativeness expressed by the length (in km)

Associated code	Definition text
1	< 1 km
2	1– 10 km
3	> 10 km

And in the Table 5.5. is expressed the radius (in km) of the area that the station represents (for all other station types, except traffic).

Table 5.5. Representativeness expressed the radius (in km)

Associated code	Definition text
1	< 1 km
2	1– 10 km
3	10-50 km
4	>50 km

For traffic stations

- the assessed traffic volume expressed by the annual average daily traffic(in thousand vehicles per day).
- the distance from kerb (in meters),
- the heavy-duty fraction of traffic expressed in percentage of the average daily traffic,
- the average traffic speed (in km per hour),
- the distance between and the height of building facades in case of canyon streets expressed as a ratio.
- the width (in meters) of the street/road in case of non canyon street.

Chapter Six

New Monitoring Sites for Kosovo

According to detailed selection and clarification criteria described above the new locations are identified as possible locations for expansion and development of Air quality network monitoring system for Kosovo.

6.1. Description of Mitrovica area

Total surface of Mitrovica is 350 km^2. It lies in northern part of Kosova in height of 508 m. It is in 42.53 of geographic width and 25.52 of east geographic width.

Geographic position is and advantage due to its landscape. The city is surrounded with Kreshbardha/Kopaonikut, Rogozna, Mokna and Qyqavica mountains. Territory of this municipality is neighbored with municipality of Zveçan (in north), with municipality of Besiana/Podujevo (in east), with Vushtrri/Vucitrn (in south), with Skenderaj/Srbica (in west) and with municipality of Zubin Potok (in northwest).According to recent estimations now there are 120.000 inhabitants.

The region of Mitrovica is known for big reserves of lead and zinc. To illustrate this, we can mention the case of "Trepça", that until 90.s was biggest producer of lead, zinc and accumulators in former Yugoslavia. Since Mitrovica was an industrial city, it was among most polluted areas.

Until the cessation of the smelter activities, the metallurgical processing of lead and zinc concentrates caused significant environmental pollution and adverse health effects for workers and the public, due to emissions of heavy metal bearing dusts and toxic gases (sulphur dioxide, sulphur trioxide, carbon monoxide, nitrogen oxides, etc).Further air pollution can occur from windblown dusts accumulated at the smelter facilities as well as from wind erosion of fine particulates from uncovered tailings/processing residues present at the respective sites, i.e. from the Mitrovica Industrial Park waste deposits, the Zvecan smelter waste piles or also from uncovered dry mine tailings.

Due to the presence of various profound sources for air pollution (i.e. Mitrovica Industrial Park and associated waste disposal sites, Zvecan smelter and waste deposits/tailings) and the associated adverse health effects for the people living in and around Mitrovica, several studies have been performed with respect to air quality and dust deposition in this area.
These studies focused mainly on the concentration of dust (total suspended particulate matter, TSP) and heavy metals (especially lead) in the air, the measurement of dust deposition rates

(incl. metal concentrations in precipitated dust) as well as the source apportionment of air pollution.

The main danger for public health due to the base metal mining in the Mitrovica area is the absorption of lead. Lead enters the body through swallowing or inhaling. The lead remains in the blood stream for a few weeks before being absorbed into the bones where it can be collected for a lifetime, replacing some of the calcium and weakening the bones.

Figure 6.1. Possible sources of pollution and location in Mitrovica

Location at Mitrovica as shown in Figure 6.1. according the type of area is classified as sub-urban (associated code-2 and definition code-S) and according to emission sources is considered as background(associated code-3, definition code B). This location is representative for Mitrovica, where is concentrated high density of population and it is located between the two sources- 2.68 km air way from smelter in northen part in Zvecan area, and 1.3 km air way from Industrial Park in south east of Mitrovica. As shown in fig.6 .1.

Compounds that are related to actual pollution problems and should be measured are main pollutants as SO_2. NO_X, CO, O_3, PM_{10} $PM_{2,5}$ and heavy metals in PM_{10} particularly lead.

Figure 6.2. Location of Mitrovica site

Description of location

AQS Site ID: 01,HMIK/MESP
Location: HMS-Mitrovica
Country: Kosovo
Coordinates: 42°53'38.27"N , 20°52'23.00"E
Date Established: it is in the installation phase

Location Setting:
This site is located in within the yard of HMS near the area with density population. The sample inlet is 4 meters above ground level. The site meets the requirement to be classified as sub-urban background site.

Monitoring Objective:
The monitoring objectives are to determine compliance with air quality limit value to detect pollutant levels of SO2, NOx, CO, O3,PM10, and heave metals in PM10, and to provide pollutant levels for daily air quality index reporting

Monitor	Monitoring Equipment	Analysis Method	Sampling Frequency	Monitor Est.
NOx		Chemiluminescence		Expected in 2011
SO2		Uv-fluorescence		
CO		Non dispersive infrared		
O3		Uv-photometry		
PM10		Gravimetry		
Heavy metals		Atomic absorption spectroscopy		

Area of Representativeness:
This site represents ecosystem and population exposure with CO, O3,PM10, and heave metals in PM10.
This site is southeast of the City of Mitrovica in the area expected to be representative of maximum heavy metals (particularly Pb) concentrations and CO in the Mitrovica.

6.2. Description of Drenas area

Territory of municipality of Drenas lies is in central Kosovo. General surface of the municipality is 290 km2 or 2.66 percent of overall Kosovo territory. The whole area, consisting 42 residencies, is encircled with mountains of Berisha, Kasmaq, Qyqavica, Golesh and Lipovica (Blinaja).Surface of Drenica valley is penetrated by irrigation system .Ibër. Distinction of this area is mine and foundry of .Feronikel., as well as some stone separations.According to recent estimations now there are over 73.300 inhabitants. Population density is 284 inhabitants per 1 km2.

Lack of genuine landfill is a special problem that causes systematic pollution of environment and health problems.Re-activation of Ferronikel may emit toxic gases and other industrial remains that is serious threat for population and environment because is located near by residence.

Industrial complex of Ferronikeli comprises of two opencast mines and foundry: Open cast mines are Cikatova mine and Gllavica mine.Main problems of environmental pollution from mines are that during the mining a high quantity of dust will be released and this particularly during summer, which damages environment of villages around mining.

If the preparation of ore is not done, a high quantity of dust is released which is dangerous for the environment and the health of workers in this department because the ore of Fe-Ni has a quantity of SiO_2 more than 50%.

Figure 6.3. Location for monitoring station in Drenas

Location at Drenas as shown in Figure 6.3. above according the type of area is classified as urban (associated code-1 and definition code-U) and according to emission sources is considered as background(associated code-3, definition code B).

This location is representative for Drenas, because is located in urban area near by municipality and is in a distance of 1.8 km air way from Feronikel and also Cikatova minies by this location and can be considered as stations where populations is influenced by this sources and traffic as well. The components which have to be measured in the station are: NOx, SO2, O3, Pb, benzene, PM10, PM2.5 and CO. Together with Pb other heavy metals (As, Cd, Ni) should be analyzed as well.

Figure 6.4. Location of Drenas site

Description of location

AQN Site ID: 04, HMIK/MESP

Location: Municipality- Drenas

Country: Kosovo

Coordinates: 42°37'33.13"N,

20°53'46.45"E

Date Established: it is in the installation phase

Locational Setting:
This site is located in within the yard of Municipality of Drenas in the area with density population. The sample inlet is 4 meters above ground level. The site meets the requirement to be classified as urban background site.

Monitoring Objective:
The monitoring objectives are to determine compliance with air quality limit value to detect pollutant levels of SO2, NOx, CO, O3, PM10, and heave metals in PM10, and to provide pollutant levels for daily air quality index reporting.

Monitors with Site Designation:

Monitor	Monitor Equipment	Analysis Method	Sampling Frequency	Monitor Est.
SO2,				Expected in 2011
NOx				
O3				
PM10				
Heavy metals				

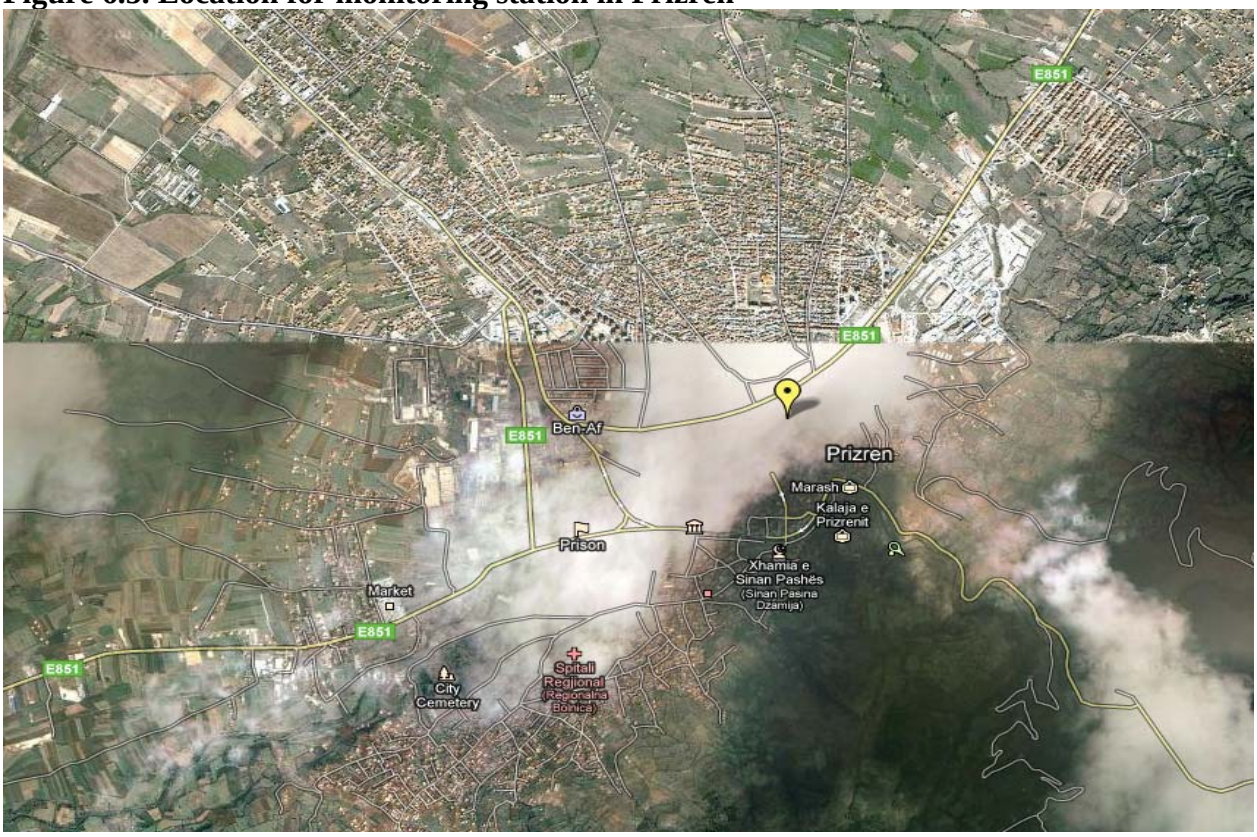
Area of Representativeness:
This site represents population exposure with SO2, NOx, CO, O3,PM10, and heavy metals in PM10. This site is southeast of the City of Mitrovica in the area expected to be representative of maximum heavy metals concentrations and NOx, SO2 and PM10/PM2.5 in the Drenas

6.3. Description of Prizren area

Prizren is second biggest city in the Kosovo zone having about 225.531 inhabitants.

Municipality of Prizren lies in southwestern part of Kosovo. It neighbors with Albania in west, with FYROM in southeast, with Gjakova / Djakovica in northwest, with Rahovec in north, with Suhareka in northeast, with Shterpce in east and with Dragash in south.

Figure 6.5. Location for monitoring station in Prizren



Location at Prizren as shown in Figure 6.5. according the type of area is classified as urban (associated code-1 and definition code-U) and according to emission sources is considered as background(associated code-3, definition code B).

This location is representative for Prizren, because is located in urban area near by municipality and it covers integrated contribution from all sourses upwind of the station (e.g.by all traffic, combustion sources, upwind of the station in the city).

The components which have to be measured in the station are: NOx, SO2, O3, Pb, benzene, PM10, PM2.5.

Figure 6.6. Location of Prizren site

Description of location

AQN Site ID: 05, HMIK/MESP
Location: Municipality-Prizren
Country: Kosovo

Coordinates: 42°12'58.92"N , 20°44'30.56"E

Date Established: Expected in 2011

Locational Setting:
This site is located in within the yard of Municipality of Prizren in the area with density population. The sample inlet is 4 meters above ground level. The site meets the requirement to be classified as urban background site.

Monitoring Objective:
The monitoring objectives are to determine compliance with air quality limit value to detect pollutant levels of SO2, NOx, CO, O3, PM10, and Pb in PM10, and to provide pollutant levels for daily air quality index reporting.

Monitors with Site Designation:

Monitor	Monitor Equipment	Analysis Method	Sampling Frequency	Monitor Est.
CO				Expected in 2011
SO2,				
NOx				
O3				
PM10				
Heavy metals				

Area of Representativeness:
This site represents population and material exposure with SO2, NOx, CO, O3,PM10, and heavy metals in PM10.

6.4. Description of Peja area

Peja is known as among oldest cities in Kosovo and it is among most beautiful and rich with cultural-historic potentials and rare nature attractions. Municipality of Peja includes a territory of 603km². City of Peja lies in western part of Kosovo between 42 and 40 scale of northern geographic width and 20 and 18 scale of geographic northern length.

Peja lies along two sides of river Lumbardhi which springs in Rugova Mountains and have length of 63km until it meets the river White Drini (Drinit të Bardhë).

The city with its periphery is inhabited by around 180.000 inhabitants.

Figure 6.7. Location for monitoring station in Peja

Location at Peja as shown in Figure 6.7. according the type of area is classified as urban (associated code-1 and definition code-U) and according to emission sources is considered as background (associated code-3, definition code B).

This location is representative for Peja, because is located in urban area near by municipality and it covers integrated contribution from all sources upwind of the station (e.g.by all traffic, combustion sources, upwind of the station in the city.

The components which have to be measured in the station are: NOx, SO2, O3, Pb, benzene, PM10, PM 2.5

Figure 6.8. Location of Peja site

Description of location

AQN Site ID: 06, HMIK/MESP
Location: Square "Luan Haradinaj"-Pejë
Country: Kosovo
Coordinates: 42°39'32.52"N,
20°17'20.21"E
Date Established: Expected in 2011

Locational Setting:
This site is located in Square "Luan Haradinaj" in Peja, in the area with density population. The sample inlet is 4 meters above ground level. The site meets the requirement to be classified as urban background site.

Monitoring Objective:
The monitoring objectives are to determine compliance with air quality limit value to detect pollutant levels of SO2, NOx, CO, O3, PM10, and Pb in PM10, and to provide pollutant levels for daily air quality index reporting.

Monitors with Site Designation:

Monitor	Monitor Equipment	Analysis Method	Sampling Frequency	Monitor Est.
CO				**Expected in 2011**
SO2,				
NOx				
O3				
PM10				
Heavy metals				

Area of Representativeness:
This site represents population and material exposure with SO2, NOx ,CO, O3,PM10, and heavy metals in PM_{10}

6.5. Description of Gjakova area

Municipality of Gjakova is in southwest of Kosovo in a surface of 586 km^2. Gjakova is a city with 365 m height in a strategic position in middle of Albania and center of Kosovo.
It is connected with other centers through four highway roads, including here roads leading to Peja, Prizren, and Prishtina and in the border to Albania, through the Qafë Morina transit.

There are no precise data on the number of population living today in municipality of Gjakova / Djakovica, but according to some UNMIK figures, in 2000, Gjakova had 150.000 inhabitants.

Figure 6.9. Location for monitoring station in Gjakova

Location at Gjakova as shown in Figure 6.9. according the type of area is classified as urban (associated code-1 and definition code-U) and according to emission sources is considered as traffic(associated code-1, definition code T).

This location is representative for Gjakova, because is located in urban area in the city center, in the vicinity of a hotel, is located such that its pollution level is determined predominantly by the emissions from nearby traffic.
The components which have to be measured in the station are: NOx, SO2, O3, Pb, benzene, PM10, PM2.5.

Figure 6.10. Location of Gjakova site

Description of location

AQN Site ID: 07, HMIK/MESP
Location: Yard of Hotel Pashtriku-Gjakove
Country: Kosovo
Coordinates: 42°23'2.66"N,
20°25'42.73"E
Date Established: Expected in 2011

Locational Setting:
This site is located in within the yard of Hotel Pashtriku in the area with density population. The sample inlet must be 4 meters above ground level. The site meets the requirement to be classified as Trafik urban site.

Monitoring Objective:
The monitoring objectives are to determine compliance with air quality limit value to detect pollutant levels of SO_2, NO_x, CO, O_3, PM_{10}, and Pb in PM10, and to provide pollutant levels for daily air quality index reporting.

Monitors with Site Designation:

Monitor	Monitor Equipment	Analysis Method	Sampling Frequency	Monitor Est.
CO				Expected in 2011
SO_2,				
NO_x				
O3				
PM10				
Heavy metals				

Area of Representativeness:
This site represents population and material exposure with SO_2, NO_x ,CO, O3,PM10, and heavy metals in PM10(particularly Pb).

6.6. Description of Gjilan area

Municipality of Gjilan / Gnjilan is in southern part of Kosova, province of Anamorava. The city has a suitable position that enables it good connection with other centers in Kosovo and region. It has a surface of 515 km/2, In one square kilometer live 259 inhabitants. It lies in a broad valley. It has medium continental clime, with hot summers and cold winters.

According to Statistics Institution of Kosovo, in December 2002, total number of inhabitants is 133.724

Figure 6.11. Location for monitoring station in Gjilan

Location at Gjilan as shown in Figure 6.11. according the type of area is classified as urban (associated code-1 and definition code-U) and according to emission sources is considered as traffic(associated code-1, definition code T).

This location is representative for Gjilan, because is located in urban area in the city center, in the vicinity of a hotel, is located such that its pollution level is determined predominantly by the emissions from nearby traffic.

The components which have to be measured in the station are: NOx, SO2, O3, Pb, benzene, PM10, PM2.5

Figure 6.12. Location of Gjilan site

Description of location

AQN Site ID: 08, HMIK/MESP
Location: Yard of Municipality-Gjilan
Country: Kosovo
Coordinates: 42°27'49.55"N,
21°28'9.20"E
Date Established: Expected in 2011

Locational Setting:
This site is located in within the yard of Municipality-Gjilan in the area with density population. The sample inlet must be 4 meters above ground level. The site meets the requirement to be classified as Trafik urban site.

Monitoring Objective:
The monitoring objectives are to determine compliance with air quality limit value to detect pollutant levels of SO_2, NO_x, CO, O_3, PM_{10}, and Pb in PM10, and to provide pollutant levels for daily air quality index reporting.

Monitors with Site Designation:

Monitor	Monitor Equipment	Analysis Method	Sampling Frequency	Monitor Est.
CO				Expected in 2011
SO_2,				
NO_x				
O3				
PM10				
Heavy metals				

Area of Representativeness: This site represents population and material exposure with SO_2, NO_x ,CO, O3,PM10, and heavy metals in PM10(particularly Pb).

6.7. Description of Kaçanik area

Municipality of Kaçanik lies in southern part of Kosovo and has a surface of 306 km², respectively 2,8 % of overall Kosovo territory (10887 km²).Kaçanik it neighbors with municipalities of Vitia, Ferizaj, Shterpce and in the south with PMU of Hani i Elezit and with FYR of Macedonia.

The fact that municipality is frequented by two border points, in Han i Elezitand Qafëshqipe (formerly Glloboçica), through Kaçanik Ravine andSharr (regional road Doganaj. Tetova) is an asset that makes the Kaçanik/kacanik important and strategic place.

Kaçanik differs from other places by suitable topographic and climatic conditions. Through Ravine of Kaçanik, disperses Mediterranean clime; from south and west disperses typical mountainous clime, and from northern part comes continental clime.

Today the municipality has around 43.000 inhabitants including also PMU of Hani i Elezit, and without this PMU, municipality of Kaçanik according to estimation of MEF, has 33.000 inhabitants.

Kaçanik is mainly industrial city, economy is based in production of construction material: concrete, special glues, etc.

The main impacts in environment from cement factory are a result of physical-chemical dissolutions of the raw material and the process of burning of fuel in furnaces during high temperatures up to 14500 C.

Other potential sources of pollution from cement factory are cement mills, the warehouse of clinker, system of packaging and transportation of final products

The biggest impact in environment from the cement factory is from the dust emissions. These emissions are mainly caused from the mill for preparation of raw materials, from the system of rotational furnace and clinker cooler and cement mills.

Figure 6.13. Location for monitoring station in Kaçanik

Location at Kaqanik as shown in Figure 6.13. according the type of area is classified as urban (associated code-1 and definition code-U) and according to emission sources is considered as background (associated code-3, definition code B).

This location is representative for Kaqanik, because is located in urban area near by municipality and it covers integrated contribution from all sources upwind of the station (e.g.by all traffic, combustion sources, upwind of the station in the city.

The components which have to be measured in the station are: NOx, SO2, O3, Pb, benzene, PM10, PM2.5.

Figure 6.14. Location of Kacanik site

Description of location

AQN Site ID: 09, HMIK/MESP
Location: Square of city Kaçanik
Country: Kosovo
Coordinates: 42°13'44.57"N,
21°15'22.06"E
Date Established: Expected in 2011

Locational Setting:
This site is located in the square of city Kaqanik in the area with density population. The sample inlet must be 4 meters above ground level. The site meets the requirement to be classified as urban Background site.

Monitoring Objective:
The monitoring objectives are to determine compliance with air quality limit value to detect pollutant levels of SO_2, NO_x, CO, O_3, PM_{10}, and Pb in PM10, and to provide pollutant levels for daily air quality index reporting.

Monitors with Site Designation:

Monitor	Monitor Equipment	Analysis Method	Sampling Frequency	Monitor Est.
CO				Expected in 2011
SO_2,				
NO_x				
O3				
PM10				
Heavy metals				

Area of Representativeness:

This site represents population and material exposure with SO_2, NO_x, CO, O_3, PM_{10}, and heavy metals in PM10 (particularly Pb).

6.8. Description of Brezovica area

The proposed location is in a national park in mountains (1700 m a.s.l.).

The location itself fulfils the requirements of the rural background station although the levels in mountainous region will be representative of the similar conditions elsewhere in Kosovo.

Figure 6.15. Location of the Brezovica rural background monitoring station

Figure 6.16. Location of Brezovica site

Description of location

AQN Site ID: 10, HMIK/MESP
Location: Touristic area in Brezovica
Country: Kosovo
Coordinates: 42°10'58.69"N

21° 2'14.46"E

Date Established: Expected in 2011

Locational Setting:
This site is located in the skiing area. The sample inlet must be 4 meters above ground level. The site meets the requirement to be classified as rural Background site.

Monitoring Objective:
The monitoring objectives are to determine compliance with air quality limit value to detect pollutant levels of SO_2, NO_x, CO, O_3, PM_{10}, and Pb in PM10, and to provide pollutant levels for daily air quality index reporting.

Monitors with Site Designation:

Monitor	Monitor Equipment	Analysis Method	Sampling Frequency	Monitor Est.
CO				Expected in 2011
SO_2,				
NO_x				
O3				
PM_{10}				
Heavy metals				

Area of Representativeness:

This site represent ecosystem exposure with SO_2, NOx, CO, O_3, PM_{10}, and heavy metals in PM_{10}, particulary Pb.

Chapter Seven

Financial Needs and Midterm Planning

7.1 Financial needs for implementations.

Modern air quality monitoring systems largely rely on automatic analyzers which provide continuous real-time information of pollutant concentrations in ambient air. These equipments are used to monitor the most important pollutants in the air: sulphur dioxide, nitrogen dioxide and nitrogen monoxide, carbon monoxide, ozone, and particulate matter.

The completed Air Quality Network will be managed by the IHMK which also maintains the calibration laboratory for the control of instrument performance, as well as the upgraded chemical laboratory for detailed analyses of atmospheric pollutants.

The estimated budget breakdown for one monitoring station includes:

Table 7.1. Estimated capital expenses for one monitoring station

Monitor Monitoring Equipment	Analysis Method	Quantity	Budget price Euro
Nox analyzer	measurement of NO2 and NO by chemiluminescence	1	11,000.00
SO2 analyzer	measurement of SO2 by UV fluorescence	1	11,000.00
CO analyzer	measurement of CO by Non dispersive infrared (NDIR) spectroscopy	1	11,000.00
O3 analyser	measurement of ozone by UV photometry	1	11,000.00
PM10 analyser	Gravimetry	1	22,000.00
PM2.5 analyzer	Gravimetry	1	22,000.00
Heavy metals (Pb, Cd, As, Ni)	Atomic absorption spectroscopy	1	22,000.00
Container for station		1	50,000.00
Software for data collection and validation		1	20,000.00
Server system		1	5,000.00
Installation of instruments		1	10,000.00
Staff Training		1	3,000.00
		Total for one monitoring station	**198,000.00 €**

Based on the project finding total 8 stations are required for development of Air Monitoring System.

Table 7.2. Total budget for eight monitoring station

Monitoring locations	Quantity	Unit price	Budget price Euro
Mitrovica Drenas Prizren Peja Gjakova Gjilan Kaqanik Brezovica	8	198,000.00	1,584,000.00
		Total Budget	**1,584,000.00 €**

7.2 Staff resources

Assuming that such a network would consist of 8 automatic stations, this network could be managed with 8 people. If we take into consideration also optional modules for analytical laboratory and modelling than this number will increase up to 13 people.

Table 7.3.Staff resources for managing the monitoring station

Unit	Function	Number	Monthly salary	Total one year
	head of unit	1	500	6,000.00
monitoring network operation				
	head of subunit,	1	400	4,800.00
	Engineer	1	350	4,200.00
	technicians	1	350	4,200.00
calibration laboratory				
	head of subunit	1	400	4,800.00
	engineer, technical level	1	350	4,200.00
data centre				
	head of subunit	1	400	4,800.00
	IT specialist	1	350	4,200.00
	optional: communication officer	*1*	*300*	*3,600.00*
optional: analytical laboratory				
	engineer, technical level (inorganic)	*1*	*350*	*4,200.00*
	engineer, technical level (organic)	*1*	*350*	*4,200.00*
				-
optional: modelling				
	scientist (meteorologist)	*1*	*350*	*4,200.00*
	engineer (emission data base)	*1*	*350*	*4,200.00*
Total ***total with options***		***8*** ***13***		***37,200.00*** ***57,600.00***

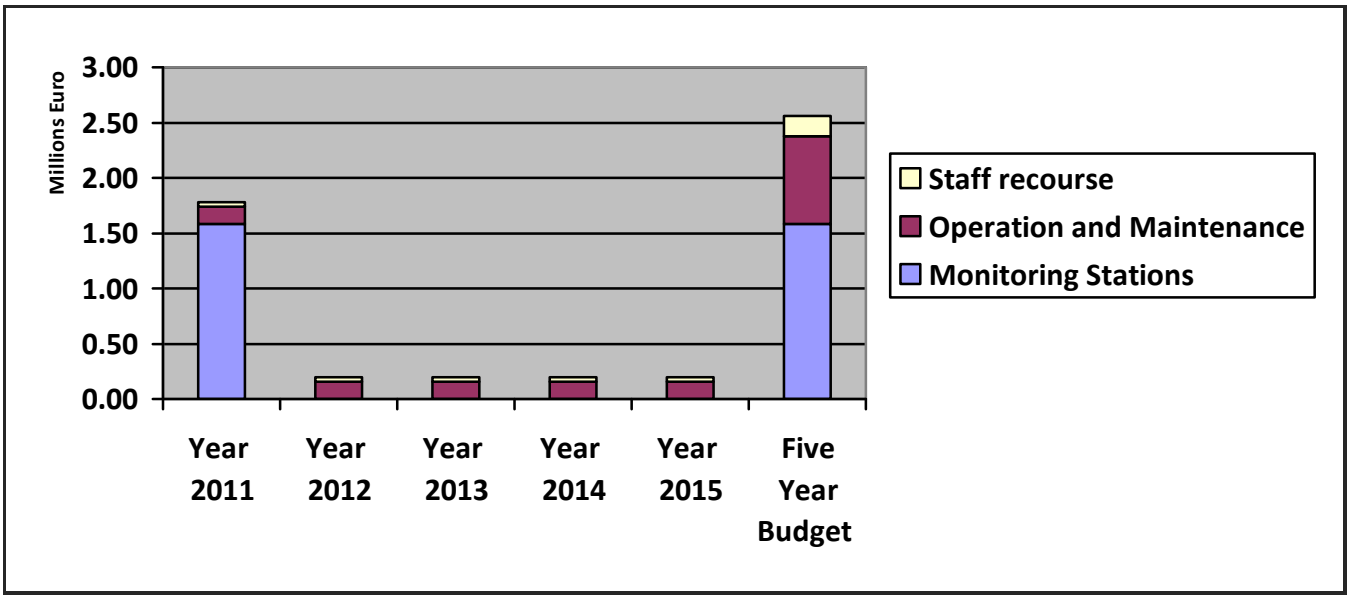
7.3 Midterm Planning for New Monitoring Stations

Actual costs to operate and maintain the monitoring station varies from country to county but as an estimate it is calculated 10-20% per annum of the original cost of the system.
Five year midterm plan is presented in the table below.

Table 7.4. Five year budget breakdown.

Description	Year 2011	Year 2012	Year 2013	Year 2014	Year 2015	Five Year Budget Euro
Monitoring Station (initial setup for 8 locations)	1,584,000.00					1,584,000.00
Operation and Maintenance	158,400.00	158,400.00	158,400.00	158,400.00	158,400.00	792,000.00
Staff recourse	37,200.00	37,200.00	37,200.00	37,200.00	37,200.00	186,000.00
Total	**1,779,600.00**	**195,600.00**	**195,600.00**	**195,600.00**	**195,600.00**	**2,562,000.00**

Fig. 7.1. Five year budget breakdown.



Chapter Eight

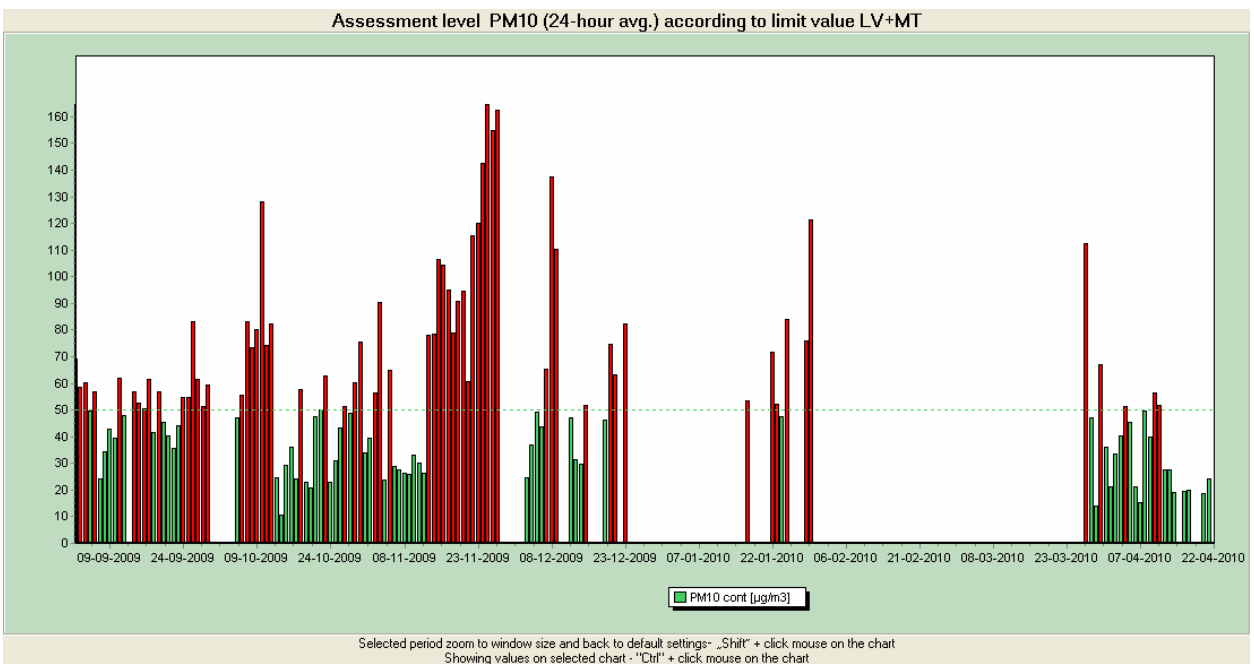
Compliance with EU Standards

8.1 PM_{10} – Particulate Matter

The preliminary assessment of air quality in Kosovo is based on currently available air quality data from limited monitoring activities. The monitoring data is evaluated according to the European air quality standards. Existing and limited data for air quality, primarily obtained from measurements in Prishtina municipality in location of IHMK for the period September 2009-April 2010, shows that:

PM_{10}- average concentration of PM_{10} was in this monitored period 56.6 µg/m^3, and it can be considered that the daily limited value above the 50 µg/m^3 could be exceeded more than 100 days during one year, while the acceptable number of exceeds limit value in year are 35 days. The maximum registered value of PM_{10} in this period was 164 µg/m^3, which is represented in Figure. 8.1.

Figure 8.1 Monitoring of PM10 in IHMK, during the period September 2009-April 2010



Taking in the consideration the existing measurements of suspended particles in air it can be concluded that in sub-urban area of Prishtina municipality, the limited values of PM_{10} according the EU standards are exceeded. It is clear that situation in the center of the Prishtina city is worse and doesn't fulfill the EU standards, where the density of the traffic is high. So, it can be expected that yearly average value of PM_{10} could be reached the levels above the limit values of 60µg/m³ for more than 200 hundred days in the urban area where is high density traffic.

Consequently, it is necessary for actions which will reduce the concentrations of PM_{10} in order to meet the EU standards, particularly in urban and industrial areas.

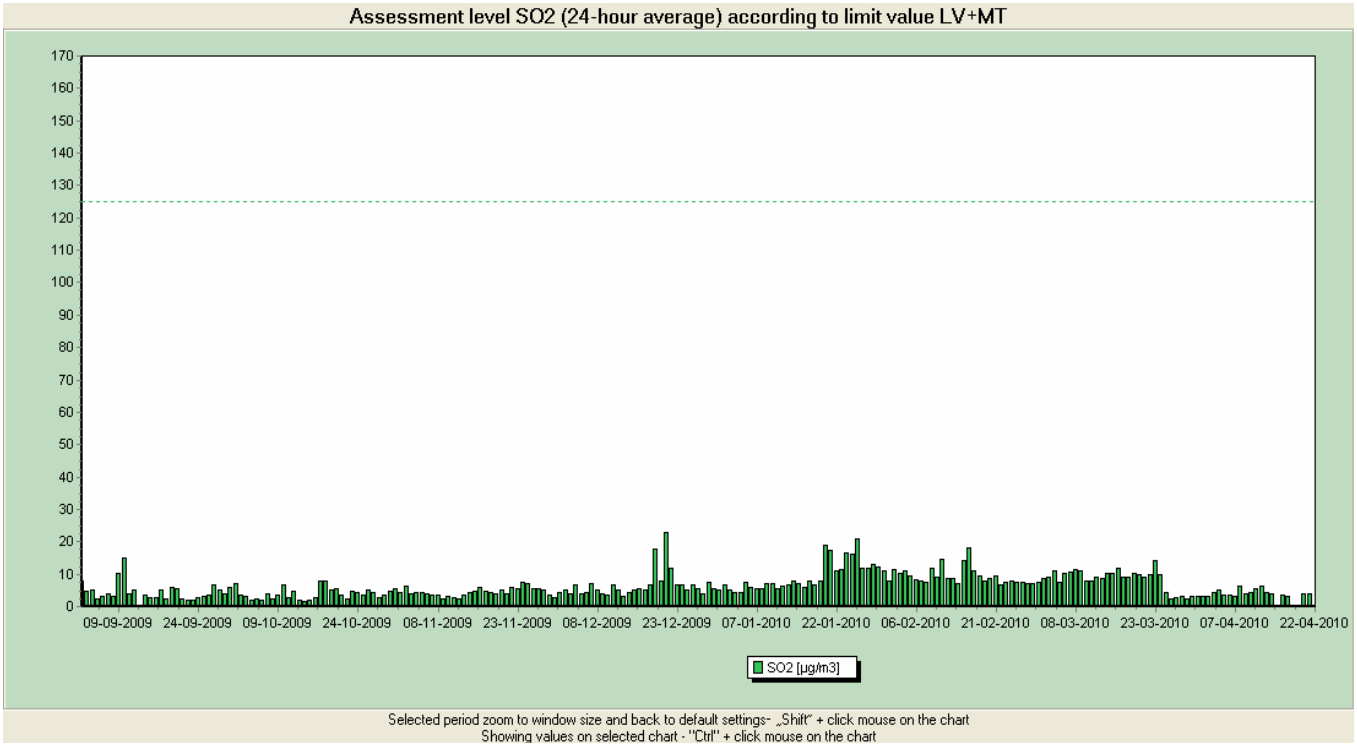
It is important to assess from which sources comes the pollution with PM10. In this pollution can contribute traffic, industry and domestic heating. According to the type of pollution and assessed percentage from which sources it comes pollution, we could propose plans either to improve industrial installations or to reduce pollution of PM 10 by introducing the catalytic convectors or by enforcing the inspection.

8.2 SO2 – Sulphur Dioxide

SO_2-During the monitoring period September 2009 - April 2010, at this site, the maximum value of hourly average for SO_2 was 98.5µg/m^3, while the average daily value for the concentration of SO_2 was 6.5µg/m^3, the maximum daily average for SO_2 was 23µg/m^3, which means that limit values are not exceeded in this location and the, as shown in Figure.8.2.

From measurements carried out in background suburban location, close to Prishtina, we can conclude that EU standards of SO_2 are met for this location. Since the presented values are referred to the short period from September 2009 to April 2010, we can not make the complete assessment for fulfillment of limited values of SO_2.

Figure 8.2 Monitoring of SO2 in IHMK, during the period September 2009-April 2010



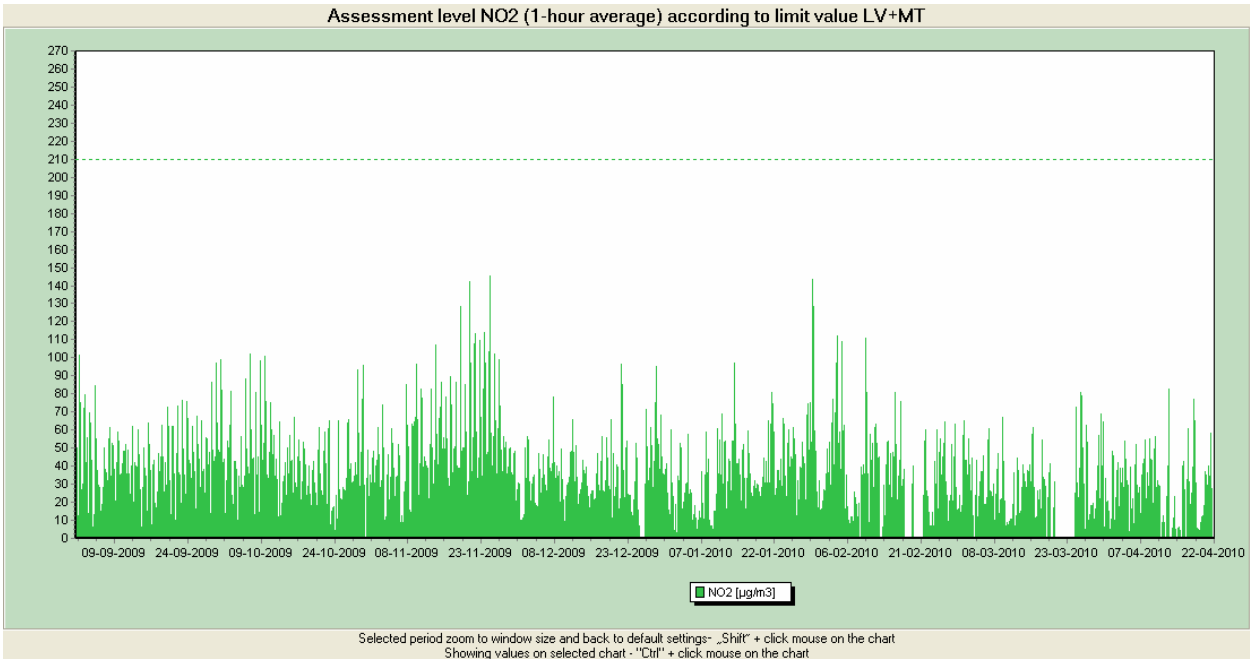
8.3 NO_2 – Nitrogen Oxide

NO_2- From measurements carried out during the period September 2009-April 2010 in this locations, continuous measurement shows that average values for NO_2 was 28µg/m^3.

Maximum value recorded during this monitoring period was 145.1µg/m^3, but the average hourly limited values of NO_2 -(200µg/m^3) was not exceeded at all during these period, as shown in Figure. 8.3.

So, we can conclude that limited yearly values of 40µg/m^3, in sub-urban background can be met.

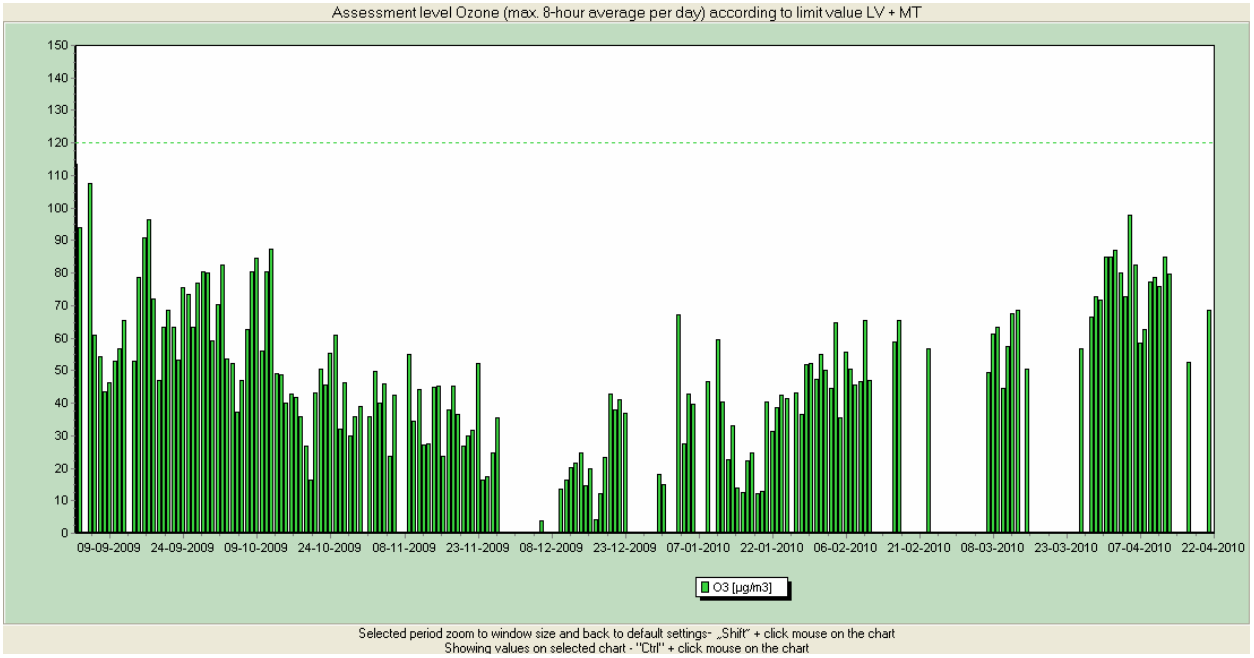
Figure 8.3 Monitoring of NO_2 in IHMK, during the period September 2009-April 2010



8.4 O3 – Ozone

O_3- From measurements in IHMK in sub-urban background site near by Prishtina municipality, the average value of ozone (O_3) during the monitoring period from September 2009 –April 2010 was 50.2µg/m^3, while the maximum value was 113.6µg/m^3. It means that limited values are not exceeded during this monitoring period, as shown in Figure 8.4.

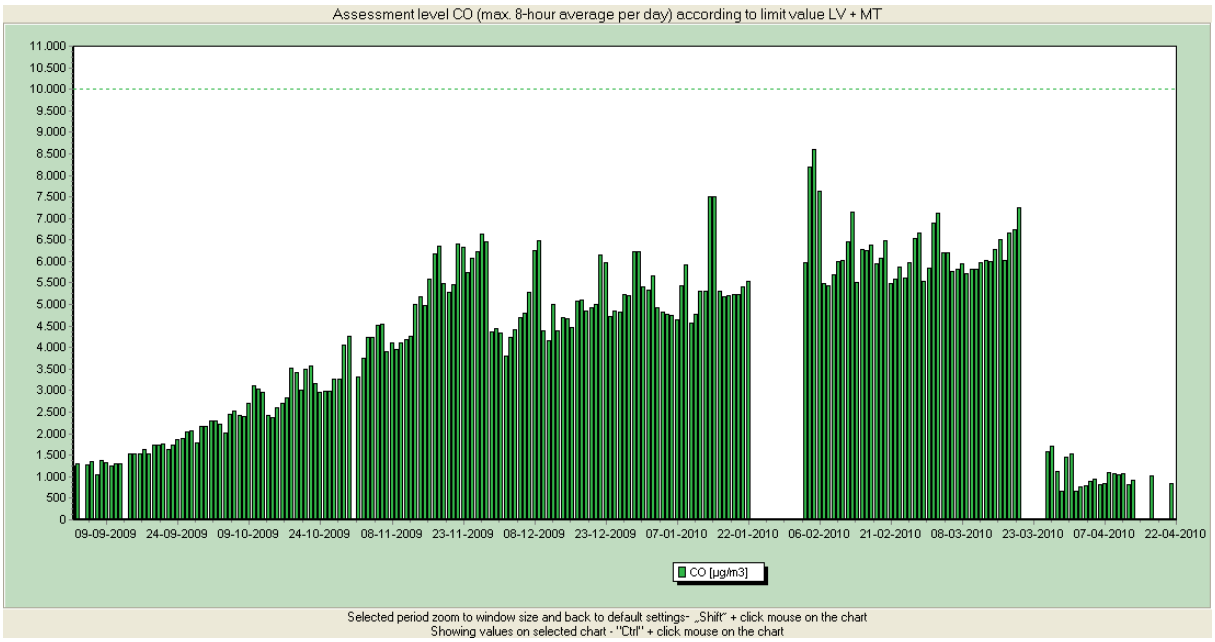
Figure 8.4 Monitoring of O3 in IHMK, during the period September 2009-April 2010



8.5 CO- Carbon Monoxide

CO- From measurements in IHMK in sub-urban background site near by Prishtina municipality, the average value of carbon monoxide (CO) during the monitoring period from September 2009 –April 2010 was 2749 μg/m^3, while the maximum value was 8611.6μg/m^3. It means that limited values are not exceeded during this monitoring period, as shown in Figure 8.5.

Figure 8.5 Monitoring of CO in IHMK, during the period September 2009-April 2010



In the Table 8.1.are shown EU standards, the average values from measurement in month January in location of IHMK and assessment level of substances in air compared with European Union standards.

From the Table. 8.1. we can see that concentrations of PM_{10} are not in compliance with EU standards and other pollutants as SO_2, NO_2, O_3, CO, are in compliance with EU standards.

But these are limited data and only measured in one site that is not sufficient for an assessment of air quality in Prishtina municipality as well as in Kosovo.

That's why was necessary to expand the monitoring sites within Prishtina municipality and to develop the air quality network for rest of Kosovo, so that we can have sufficient data in order to be able to assess the air quality for all Kosovo.

Table 8.1. Current data from Institute of Hydrometeorology of Kosovo (IHMK)

Monthly report - (January 2010) -IHMK-Prishtina - assessment level of pollutants compared with European Union limits										
	SO2 [μg/m^3]		**PM10cont** [μg/m^3]		**NO_2** [μg/m^3]		**CO** [μg/m^3]		**O_3** [μg/m^3]	
	D1	D24	D1	D24	D1	D24	D1	m D8	D1	m D8
EU- LV	350	125		50	200			10000		120
EU- NLV	24	3		35	18			0		25
EU- LV+MT	350	125		50	200			10000		120
Average concentration Station IHMK-Prishtina	**9.4**	**9.5**	**84.8**	**72.3**	**26.2**	**26.3**	**4899**	**5382**	**25.4**	**36.9**
No. limit exc.	0	0		**6.0**	0			0		0

Legend:
LV - limit value
NLV - acceptable number of exceeds limit value in year
LV + MT - limit value + margin of tolerance
Average - arithmetic average from good data in series
No of exceed. limit val. - number of exceedency limit
D1-1-hour average
mD8 - maximum 8-hour average per day
D24 - 24-hour average

By the Administrative Instruction for Air Quality of MESP of Kosovo, limit values for air quality are in compliance with EU standards and are foreseen to be fulfilled by 2017. This Administrative Instruction is discussed in Ministerial level and is preceded in Government of Kosovo for approval. Limit values according the Administrative Instruction are shown in Table 8.2.

Table 8.2. Limit values according the Administrative Instruction

Averaging Period	Limit Value	Date by which limit value is to be met
Sulphur dioxide		
1-hour	350 ug/m^3, not to be exceeded more than 24 times a calendar year	1 January 2017
1-day	125 ug/m^3, not to be exceeded more than 3 times a calendar year	1 January 2017
Nitrogen dioxide		
1-hour	200 ug/m^3, not to be exceeded more than 18 times a calendar year	1 January 2017
Calendar year	40 ug/m^3	1 January 2017
Benzene		
Calendar year	5 ug/m^3	1 January 2017
Carbon monoxide		
Maximum daily 8-hour mean(1)	10 ug/m^3	1 January 2017
Lead		
Calendar year	0.5 ug/m^3	1 January 2017
PM $_{10}$		
1-day	50 ug/m^3, not to be exceeded more than 35 times a calendar year	1 January 2017
Calendar year	40 ug/m^3	1 January 2017
PM$_{2.5}$ STAGE 1		
Calendar year	25 ug/m^3	1 January 2017
PM $_{2.5}$ STAGE 2 (2)		
Calendar year	20 ug/m^3	1 January 2020

Chapter Nine

Discussion of Future Monitoring in Kosovo

9.1 Kosovo Air Quality Legislation

The air sector priorities within the MESP during the eight year period, since its establishment, were drafting and completing the legal framework for air quality with long-term perspectives of approximating the EU Acquis. In this term Law on Air, Administrative Instructions are approved and amended so that the respective requirements of the Acquis are fully incorporated into the national legal order in the air sector.The Law on Air Protection was drafted in accordance with certain EU Directives, 96/62/EC, 93/30/EC, and amended in accordance with directive 2008/50/EC in 2010.

The Law categorizes main pollution sources, sets basic air pollution indicators and obligations and recommends adoption of limits for air discharge according to EU standards. The Law stipulates the obligation for drafting Kosovo strategy on air and action plan, air protection program and local air protection programs in accordance with general program.

According to the Law the air monitoring program should be organized by the MESP based on available data on monitoring system cities and settlements with assumed high level of pollution must be given special attention with respect to air quality protection, both by the number and method of monitoring the critical indicators and by a better control of stationary and mobile sources of emissions.

As sub-legal acts are approved by the Minister: Administrative Instruction on discharges of pollutants from stationary sources and Administrative Instruction on the control of volatile organic compound (VOC) emissions resulting from storage, loading or unloading and transportation of petrol. Other sub-acts as:

Draft Administrative Instruction for substances that harm the ozone layer, Draft Administrative Instruction for the allowed norms of discharges in air by mobile sources are discussed in the working group at Ministerial level and proceeded for further discussion within the intergovernmental groups in order to be approved by the Government of Kosovo. The Draft Administrative Instruction on Air Quality norms is in the procedure of discussion in Ministerial level. The major challenge of the Air Sector within the MESP was achieving and maintaining compliance with EU policies and legislation on air quality management.

Having this in mind, the Air Sector within MESP should endeavour to focus its efforts and actions on addressing those issues and requirements that are fundamental to the implementation of the legislation in this sector, in particular by ensuring that:

- Assessment of ambient air quality should be undertaken in a qualitative way as a condition for drafting the strategy for air quality improvements and inventory of pollution sources

- A comprehensive plan (air quality management strategy) should be compiled in order to be improved and maintained air quality, addressing all pollutants of concern

- All other bodies or interest groups that have a significant role in air quality management should be involved.

- In order to be enforced the legislation, administrative instruction, permits and licenses in these legal acts should be incorporated the adequate provisions. In particular, it is important to be allocated sufficient human and technical resources so that all functions in air quality management will be properly performed;

- In order to keep records and report it is necessary to fulfill the requirements of the directives.

- The air quality management plan should be regularly reviewed and updated.

9.2 Report to EU Monitoring Network

The data that will be obtained by Air Quality Network will serve as a basis for reporting public of Kosovo and EU bodies as EEA(EUROAIRNET and EIONET), for air quality as a main information requirement for all European member States to exchange the information concerning the air quality.

EEA- has to provide the European Community and its Member State "objective reliable and comparable information at a European level enabling the MS to take the requisite measures to protect the environment, to assess the results of such measures and to ensure that the public is properly informed about the State of the environment". To be able to fulfill this requirement to provide information, EEA must ensure that it receives air quality information, which gives a representative picture of European air quality. To fulfill the information requirements on a reasonably timely basis, EEA has also indicated that one year's data should be available within the first 6 months of the next year.

The European Environment Agency (EEA) has been developing an infrastructure for supporting and improving the environmental data and information flows in order to assist member countries in their data reporting task. This reporting infrastructure and the related suite of web-based tools and applications are referred to as Reportnet.

In order to have reliable data and to be able to report the public of Kosovo for actual situation concerning the air quality in Kosovo we should have available at least one year measurement data from all sites in determined cities of Kosovo.

These data should serve as a basis for air quality assessment and improvement of air quality in each municipality and action plans for reduction of air pollution and its improvement. The data after one year measurements can be used for modeling purposes as well in order to eventually relocate the stations in other sites from previous ones, or these data will serve to decide if it is necessary to put additional stations.

By the Administrative Instruction on "Air quality norms", in the Article 24. is also foreseen information of the public as stated: "The Ministry shall make available to the public annual reports for all pollutants. Those reports should summaries the levels of exceeding limit value, that information shall be combined with a summary assessment of the effects of those exceedances".

For the purpose of reporting the public of Kosovo about the air quality as well as for environmental state in general, within the MESP was established the Environmental Protection Agency of Kosovo. The KEPA in the future when Kosovo will join the EU will be able to report to European Environmental Agency for air quality as well.

In order to be able to report to international EU bodies as EIONET, for air quality of Kosovo, it is necessary to have international codification for all station where we are measuring the air quality.

9.3 Final Assessment and Discussion

With these limited sources of data from monitoring activities in Prishtina municipality, only a limited picture of air quality in Kosovo was available. It is necessary to expand the existing monitoring sites with new locations for measurement the air quality in Prishtina municipality, so that more sources of pollution can be measured.

In order to make assessment of air quality in all Kosovo, it is necessary as soon as possible to develop the Network monitoring system for all Kosovo that is also obligation which is foreseen by the Air Quality Law.Development of this Network monitoring system for all Kosovo included sites where population and ecosystem are exposed by industrial sources, which are located in three municipalities where is considerable location of industry, such as Mitrovica, Drenas and Kaçanik.

Besides existing stations in Prishtina municipality, Prishtina is considered as a city which is influenced by the pollution from power plants which are a distance of 3km from KEK –power plants (Kosovo A and B). The thermal power plants of KEK, Kosova A and B, with a total capacity of 1,513 MW are a major source of ongoing air pollution. The key polluting substances are sulphur dioxide (SO_2), nitrogen oxide (NOx), ozone (O_3), led (Pb), carbon dioxide (CO_2), dust, smoke, suspended particles, and dioxin. At the core of the air analysis in the power plant complex, it can be concluded that dust emission exceeds maximum allowed concentration by many times.

The locations of sites in three municipalities are considered because of sources of pollution, since in these three municipalities there are industrial activities as Mitrovica, Drenas and Kaçanik. Mitrovica is located in north part of Kosovo and there we deal with the pollution from previous activities in the past and it counts as one of the biggest polluters with its industrial waste from the Trepça complex. Although the lead foundry was closed down in 2001, the remaining dust from particles the industrial wastelands present a serious health hazard.Kacanik- In eastern Kosovo, the cement factory Sharcem, in Hani i Elezit, it is considered another polluter. However, after an Environmental Impact Assessment (EIA) study of the factory, the management undertook certain measures to decrease the level of air pollution.The main pollutants from this factory are PM_{10} and $PM_{2.5}$.

Drenas is considered another industrial area with high level of pollution that is coming from the Industrial complex of Ferronikeli which is comprised of two opencast mines and foundry: Open cast mines are Cikatova mine and Gllavica mine.During the mining a high quantity dust is released and this particularly during summer, which damages environment of villages around mining and these are represent the main problem concerning the air pollution from mines.

If the preparation of ore is not done, a high quantity of dust is released which is dangerous for the environment and the health of workers in this department because the ore of Fe-Ni has a quantity of SiO_2 more than 50%.

Within the rest towns of Kosovo are determined sites according the defined criteria as in Prizren, Peja, Gjakova, Gjilan and rural site-Brezovica. The locations in cities as Prizren, Peja, Gjakova, are taken in consideration because of number of population and they reflect more to urban background station and traffic urban station. Brezovica location-sites is taken in consideration because is consider as a reference site with almost no pollution. The development of Air Quality Network was based on the EU Directive 2008/50 and respecting the Draft AI on Air Quality norms, of the MESP of Kosovo

With the development of Air quality network a comprehensive picture for air quality will be obtained, so that the results from determined sites within this developed Air quality network and enables the making of more careful plans to reduce the air pollution where the limited values are exceeded as well as to maintain limited values which are in compliance with the EU standards.

One of the most demanding European Union policy areas, the environment has become important in the accession negotiations process. In this respect Kosovo is facing the great challenge since environmental policies are considered to be one of the most complex ones. If Kosovo as a candidate country do not accomplish the EU criteria the exception process may be postponed till sufficient condition are fulfilled.

9.4 Conclusion and Recommendations

With this project the proposed new monitoring network of air quality for all Kosovo, has been documented. Besides the existing stations in Prishtina municipality there are plans for other sites for 8 municipalities of Kosovo.

With this network monitoring of air quality for all Kosovo are completed the sites in Prishtina municipality as well as in other cities in Kosovo, as in Mitrovica, Drenas, Prizren, Peja, Gjakova, Kaçanik, Gjilan, Brezovica.

For Prishtina the minimum number of the monitoring stations shall be two stations – one traffic station and one urban background station. Existing station at IHMK premises is meeting criteria for the urban background station. This station is not necessary to relocate.

The NIPH 1 station in Prishtina municipality is located at a junction with a heavy traffic. In order to include this station to the national air quality monitoring network it is necessary to relocate station to location which will meet the criteria for heavy traffic. If this station will be relocated to suitable location and complement with the new PM container and complement later with ozone and carbon monoxide analyzers it will be traffic station for Prishtina.

The other option for traffic station for Prishtina is to install one new station, to suitable location in Prishtina and relocate PM container which are located within vincity of the Ex-Rilindja building-Governmental Building, to Kacanik where main problem will be particulate matter due to nearby cement factory. So, it was recommended to expand the air quality monitoring system for Prishtina with other sites. For new station, it is proposed to be located within the ex -complex Rilindja where the Governmental building is. The site in INPH 1 is recommended to relocate within the Faculty of philology.

For other municipality after visiting the possible locations, there were determined the sites for each city, to be established the Air Quality Network for all Kosovo, taking in consideration all relevant information about source of pollution , type of area, number of inhabitants and other relevant factor. There were included sites within the city of Prishtina, Mitrovica Drenas, Kaqanik) where industrial pollution affects those cities and other four big cities are included within Air Quality Network as Prizren, Peja Gjakova and Gjilan. There were determined sites which represents either urban background or traffic urban locations in these four cities. As referent city was taken in consideration Brezovica location.

By this Air Quality Network we can get sufficient and appropriate data for air quality in Prishtina municipality as well as for all Kosovo. These data will serve as a basis for air quality assessment

in each municipality. By assessing the air quality of Kosovo we can propose plans and programs to reduce air pollution and improve the air quality for all Kosovo.

The data after one year measurements can be used for modeling purposes as well in order to eventually relocate the stations in other sites from previous ones, or these data will serve to decide if it is necessary to put additional stations.

The obligation to ensure permanent monitoring of air quality as well as its impact on environment and the population health and based on that to propose action plans for air quality as well as local action plans derives from the Air Protection Law. By improving the air quality we protect the ecosystems and human health that are obliged by Environmental Protection Law.

In order to have reliable data of air quality in Kosovo we should have available at least one year measurement data from all sites in determined cities of Kosovo. After we get data from measuring sites during the one year period we should inform the public at least once a month through electronic and written media concerning the air quality in each municipality and generally for all Kosovo.

The data that will be obtained by Air Quality Network will serve as a basis for reporting besides the public of Kosovo and EU bodies as EEA (EUROAIRNET and EIONET), for air quality as a main information requirement for all European member States to exchange the information concerning the air quality. In order to be able to report to international EU bodies as EIONET, for air quality of Kosovo, it is necessary to have international codification for all station where we are measuring the air quality.

By the accomplishing the objective of establishment of Air Quality Network Kosovo as potential country of EU and in future the country that will join the Europe will be fulfilled the preliminary obligation for reporting to EU reporting bodies.

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Appendix 1

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